Subjective Well-Being, Health and Healthcare Utilization: A Study of Rural Elderly in Odisha

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by

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This to certify that the thesis entitled "**Subjective Well-Being, Health and Healthcare Utilization: A Study of Rural Elderly in Odisha"** being submitted by Pallavi Banjare for the award of the degree of Doctor of Philosophy in Humanities and Social Sciences of NIT Rourkela, is a record of bona-fide research work carried out by her under my supervision and guidance. Pallavi has worked for more than five years on the above topic. Her research work at the Department of Humanities and Social Sciences from National Institute of Technology, Rourkela has reached the standard fulfilling the requirements and the regulations relating to the degree. The contents of this thesis, in full or part, have not been submitted to any other university or institution for the award of any degree.

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This thesis is dedicated to my beloved husband and my two little angles Kuvam and Vihaan

Declaration of Originality

I, Pallavi Banjare , Roll Number 509HS301 hereby declare that this dissertation entitled "Subjective Well-Being, Health and Healthcare Utilization: A Study of Rural Elderly in Odisha" represents my original work carried out as a doctoral student of NIT Rourkela and, to the best of my knowledge, it contains no material previously published or written by another person, nor any material presented for the award of any other degree or diploma of NIT Rourkela or any other institution. Any contribution made to this research by others with whom I have worked at NIT Rourkela or elsewhere, is explicitly acknowledged in the dissertation. Works of other authors cited in this dissertation have been duly acknowledged under the section "Bibliography". I have also submitted my original research records to the scrutiny committee for the evaluation of my dissertation.

I am fully aware that in case of any non-compliance detected in future, the Senate of NIT Rourkela may withdraw the degree awarded to me on the basis of the present Dissertation.

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ॐ भूर्भुवः स्वः, तत्सवितुर्वरेण्यं।
भर्गोदेवस्य धीमहि, धियो यो नः प्रचोदयात्।

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Abstract

Health and well-being have a significant impact on economic security, level of independence and social interaction among the elderly**.** As there is a rapid decline in the joint and extended family system in India, the communities no longer protect the rights of the elderly people as they used to do in the past. This makes the elderly largely displaced in the community and they are more vulnerable to isolation, deteriorating health leading to disability, psychological distress, physical/mental abuse and relatively have less satisfaction in life. Socio-economic inequalities in health and healthcare utilization are more rampant among the rural elderly in comparison to their urban counterpart. Moreover, the issues of health inequalities, prevalence of morbidity, disability and psychological distress, physical/mental abuse and overall well-being are neglected especially among the rural population. The objectives of the study are five-fold: first, to assess the prevalence of multi-morbidity and socio-economic inequalities in various chronic health conditions among rural elderly; second, to examine the association of morbidity with disability and psychological distress; third, to analyze the pattern of healthcare utilization and financing among the elderly; forth, to examine the association of elderly abuse with morbidity and disability and finally, to examine the various covariates of life satisfaction among the rural elderly. In this thesis, a cross-sectional survey has been conducted by using multi-stage random sampling procedure among 310 elderly (60+ years) in Bargarh District of Odisha. Different statistical and econometrics tools such as logistic regression, generalized linear regression model and hierarchal regression have been used to address the above objectives. The findings of the study indicate that the most common prevalent diseases among the elderly are arthritis, chronic obstructive pulmonary disease, high blood pressure and cataract. Age, state of economic dependence and life style indicators are the most important measured predictors of multi-morbidity among the rural elderly. Life satisfaction is associated with various socio-economic and demographic factors including physical, cognitive health and social networks. Results also indicate that abused elderly are more prone to disability, morbidity and psychological distress. Consequently, a multidimensional approach is required to address the issues of health inequalities and overall subjective well-being among the rural elderly.

Keywords: Subjective well-being; Morbidity; Disability; Psychological distress; Abuse; Healthcare financing.

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ACRONYMS

ADL	Activities of Daily Living
APL	Above Poverty Line
AYUSH	Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy
BPL	Below Poverty Line
COPD	Chronic Obstructive Pulmonary Disease
DV	Dependent Variable
GHQ	General Health Questionnaire
HH	Household
IADL	Instrumental Activities of Daily Living
ICF	International Classification of Functioning, Disability and Health
ICIDH	International Classification of Impairments, Disabilities and Handicaps
	IEG Institute of Economic Growth
ICPD	International Conference on Population and Development
IV	Independent Variable
LMIC	Low and Middle Income Countries
LS	Life Satisfaction
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MPCE	Monthly Per Capita Consumer Expenditure
NCD	Non-Communicable Diseases
NOAPS	National Old Age Pension Scheme
NPHCE	The National Programme for Health Care for the Elderly
NPOP	National Policy on Older Persons
NSSO	National Sample Survey Organisation
OAPS	Old Age Pension Scheme
OBC	Other Backward Classes
OOPE	Out of Pocket Expenditure
PPS	Probability Proportional to Population Size
PSU	Primary Sampling Unit
QoL	Quality of Life
RSBY	Rashtriya Swasthya Bima Yojana
SC	Scheduled Caste
ST	Scheduled Tribe
SES	Socio-Economic Status
SWB	Subjective Well-Being

CHAPTER I

INTRODUCTION

1.1 Introduction

Ageing is the process of progressive change in the biological, psychological and social formation of an individual. Promotion of healthy ageing is a key approach to public health policy in many developed and developing countries (Arokiasamy et al., 2012). International Conference on Population and Development (ICPD) emphasizes on active ageing which encourages the elderly to have longer working hours and promotes their social inclusion. It also focuses on maintaining their dignity, health, independence, inter-generational solidarity, and social support (Palloni, 2002).

Successful ageing is measured on the basis of physical and mental health conditions by assessing what is commonly referred to as Subjective Well-Being (SWB). SWB is defined as a person's cognitive and affective evaluation of his or her life (Diener, Lucas &Oshi, 2002). Cognitive evaluation deals with individual's own perception of his or her life as a whole. The affective assessment of emotions, moods and feelings of the individuals can be negative or positive. People who have a high level of Life Satisfaction (LS) and who experience greater positive affect usually have a higher level of SWB.

In the area of psychology, SWB is studied through cognitive theories of emotion and other psychological constructs such as happiness, life satisfaction, and morale (Baker et al., 2005). While defining SWB, sociologists, psychologists, health researchers, and others often include measures of depressive symptoms, self-esteem and self-efficacy (Mellor et al., 2009). Gerontologists, however, have used this term in a broader sense by including physical, psychological, clinical, social, and cultural dimensions (Lawton, 1997).

1.2 International Conference on Population and Development (ICPD) and Ageing

The International Conference on Population and Development (ICPD), Program of Action (PoA) emphasized that decline in fertility level will be reinforced by sustained declines in mortality level. It would change the age structure of populations in most of the

countries and will lead towards increases in both the proportion and numbers of older population. It possesses a major challenge for the nations in terms of economic growth, health care needs and provision of personal security for the elderly population. The majority of older persons would be women as they have higher longevity than men, so they would be more vulnerable to health issues. As the PoA stated, "Ageing of populations provides both an opportunity and a challenge to all societies" (ICPD, 2014).

Successful implementation of the required policies to ensure that older people are supported to contribute socially is one of the objectives of the ICPD, Beyond 2014 Review. ICPD laid emphasis on various aspects such as; appropriate infrastructure regarding healthcare services for the elderly which should be equipped with well qualified human resource. Especially with respect to the specialized care that will be needed in coping with results of the ageing and disability. An environment to promote health and active ageing should be emphasized in which education; counseling and training should be giving to the elderly. Various barriers to employment for the elderly should be removed. Comprehensive ageing policy should be introduced and the increased participation of elderly should be encouraged. Public–private partnerships (PPP) for elderly care should be developed and they should be provided with universal, non-contributory pensions schemes. Social protection should be enhanced by strengthening of the family unit through support services and intergenerational bonds. By identifying major achievements and failures, goals can be set to support those countries that are currently moving towards an older population profile and to have an access to their human rights.

The Asia-Pacific Intergovernmental Meeting on the Second Review and Appraisal of the Madrid International Plan of Action on Ageing (MIPAA) was held in Bangkok 2012, where the Bangkok Statement on the Asia-Pacific Review of the Implementation of MIPAA was adopted. The Asia-Pacific Intergovernmental Meeting addressed the concerns about ageing populations, including older adults and their families as well as the community and society at large in Asia and Asia pacific by adopting Appraisal of the Madrid International Plan of Action on Ageing (MIPAA). It focuses on Governments to prepare for and adapt to the increases in numbers of older persons in the Asia-Pacific

region. Its key recommendations include strengthening social protection systems, ensuring enabling and supportive environments and adapting health systems in response to the needs of older persons through an integrated continuum of care. MIPAA itself staked out three priority directions for action: ensuring participation of older persons in development, advancing health and well-being into old age, and ensuring enabling supportive environments.

1.3 Millennium Development Goal (MDGs) and Ageing

The Millennium Development Goals (MDGs) aims to address eight goals such as: eradication of extreme poverty and hunger, achieving universal primary education, promote gender equality and women empowerment, reduce child mortality, improve maternal health, combat HIV/AIDS, malaria, and other diseases and sustaining and promoting environmental development.

MDGs have explicit targets on children and youth but it has not successfully addressed the issues of ageing and disability. There is a constant lack of awareness that the elderly people do play a vital role in achieving MDGs. As all those elderly who have any sort of disability, have less opportunity to work and have low socio-economic status. It has been estimated that less than 20 per cent of older people in the world are currently covered by pensions. According to the global aging data by Help age Germany there are as many as 607 million people aged 60 and above lack of income security. If the needs of older people are ignored a growing section of the global poor will fall outside the remit of current development strategies. As the world population is aging at an increasing rate the goals set out in the MDGs will be increasingly difficult to achieve. Increased life expectancy is an outcome of medical and other technological advances, but the major challenge is to ensure that elderly live a life which is fulfilling in terms of health, security and subjective well-being.

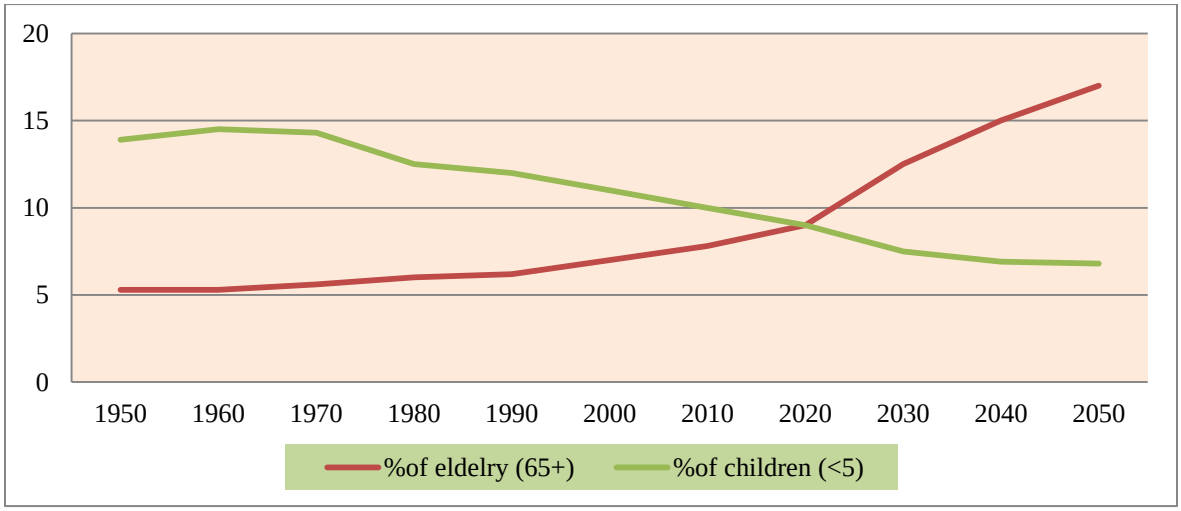
Elderly population is not taken into consideration in the MDGs but now Age International is working to ensure that the new goals for development known as the post-2015 framework take into account the issue of ageing in broader perspective. This will ensure that all rights of elderly are well protected. It also ensure that they live a healthier

and happy life, have access to schemes on social protection for people of all ages, and reduce the level of health inequality which are widespread among the elderly population all over the globe.

1.4 Global scenario of the ageing population

The world is on the brink of a demographic transition where population aging is increasing at the fast pace. In the coming time it is expected that the number of people aged 65 or above will outnumber children under age 5 (Fig 1.1). In the developing countries, there has been an increase in chronic non communicable diseases such as heart disease, cancer and diabetes due to changes in the lifestyle and diet, as well as ageing.

Figure 1.1 A comparative scenario of young children and older population as a % of global population



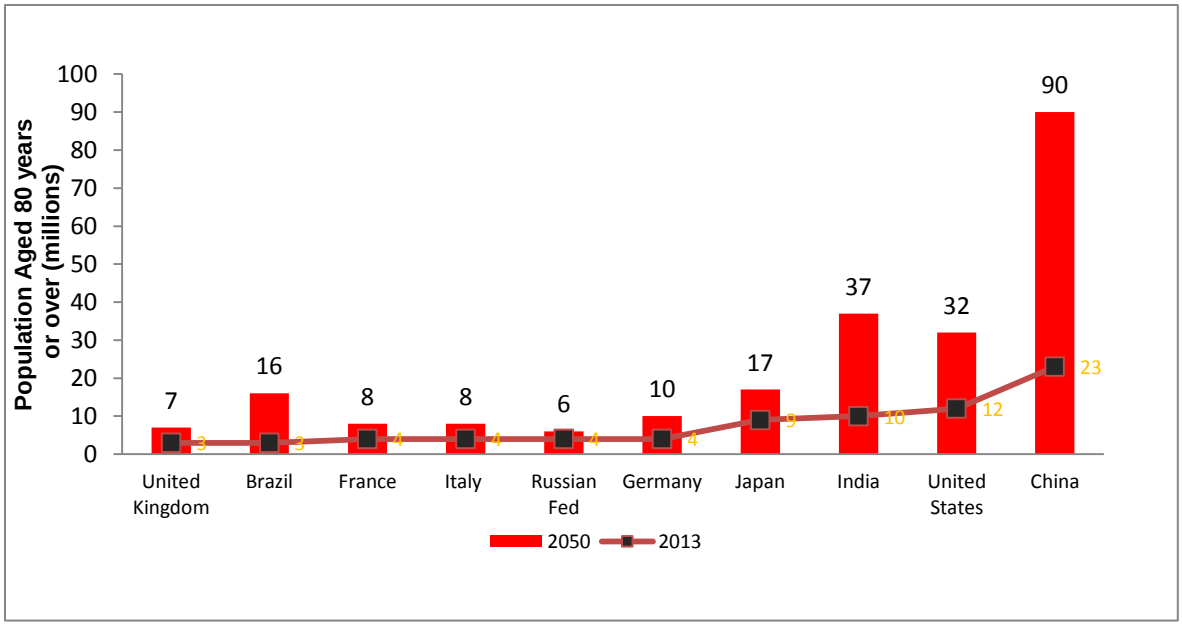
Source: United Nations. World Population Prospects: The 2010 Revision

Ageing is taking place alongside other broad social trends that will affect the lives of older people. Economies are globalizing, people are more likely to live in cities, and technology is evolving rapidly. People today have fewer children, and are less likely to live with older generations. With declining support from families, society will need better information and tools to ensure the well-being of the elderly population.

Figure 1.2 shows the ten countries with largest number of persons aged 80 years or over in 2013.Twenty-three millions persons aged 80 years or over were living in China in

2013,the country with the largest population in that age group. The United States of America had about 12 million followed by India and Japan. In 2050, China is expected to retain its position as the country with the largest population aged 80 years or with a population of over-90 million. India, which is projected to have 37 million persons in that age group, will outnumber octogenarian population the United States of America (32 million) as the country with the second largest population of people aged 80 years or over in the world.

Figure 1.2 Top ten countries with the largest population aged 80 years or over in 2013



***Source**: World population ageing 2013*

1.5 Health status of elderly in the world

The burden of chronic diseases is rapidly increasing worldwide. It has been calculated that, in 2001, chronic diseases contributed approximately 60% of the 56.5 million total reported deaths in the world and approximately 46% of the global burden of disease. The proportion of the burden of NCDs is expected to increase to 57% by 2020 (WHO, 2001). Chronic diseases account for about 80% of the global burden of disease, according to the DALY's (Disability Adjusted Life Years). DALY'S is a common measurement unit for morbidity and mortality and it facilitates comparisons of all types of health outcomes. DALY is a modification of QALY (Quality Adjusted Life Years).Both concepts combine

information about length of life and quality of life. A DALY is a negative QALY. While cancer, diabetes and heart disease contribute mainly to the major amounts of deaths every year, much of the burden of other chronic diseases like stroke, dementia and mental disorders arises from disability among the elderly. India, having an approximate population of 1.2 billion people, is soon projected to overtake China to become the world's most populous country. A study conducted by Bloom in 2011 reports that the share of India's population aged 50 and older is relatively small (16%) but notes that India will experience rapid growth among this age group in the coming years.

1.6 Organization of the thesis

The thesis is organized into nine chapters.

Chapter I: Introduction and literature review

The chapter briefly describes about demographic transition, the phenomenon responsible for an ageing society, as well as the global scenario of ageing. Subsequently aspects of ageing in Indian sub-continent are discussed followed by the scenario of ageing in Odisha. The literature review has been divided into six sections depending upon the dimensions and variables listed in the questionnaire. First, present literature on ageing as a whole discussing about various theories on ageing laying more emphasis on social theories; second, is related to socio-economic inequalities in health and morbidity patterns among elderly; third, discusses the pattern of health care utilization and financing; fourth, examines the relationship of morbidity with disability and psychological distress; fifth, deals with the effect of elderly abuse on morbidity and disability; sixth, various covariates of LS amongst the elderly. Thus, this chapter provides a general overview of the literature. Finally, rationale for the research and the research objectives are clearly defined.

Chapter II: Materials and methods

This chapter provides an overview of data and methodology used in the study.

Chapter III: Socio-economic profile of the elderly respondents

This chapter provides information on socio-economic and demographic characteristics of the sampled households and the selected elderly population aged 60 years and above. The

chapter is divided into two sections: Section I - which deals with the profile of sampled households and Section II- which presents the profile of the elderly living in the sample households. Section I covers four components: (i) housing characteristics which include: type of house, rooms, source of drinking water, sanitation facilities, main source of lightning and cooking fuel; (ii) possession of household assets; (iii) households with BPL cards and (iv) ownership of agricultural land and livestock. Section II provides information on the profile of elderly population: (i) socio-economic and demographic characteristics of elderly; (ii) working status of elderly population; (iii) economic dependency of the elderly; (iv) children staying with elderly; and (v) transfer of assets by elderly.

Chapter IV: Socio-economic inequalities in the prevalence of multi-morbidity among the rural elderly

This chapter discusses inequalities in health and morbidity patterns among elderly. At first, descriptive analysis was done to assess the socio-economic differentials in the prevalence of multi-morbidity. Secondly, binary logistic regressions were carried out to explore factors responsible for the prevalence of multi-morbidity among rural elderly in Odisha.

Chapter V: Relationship between morbidity, disability, psychological well-being and functionality

This chapter studies the association between morbidity, disability and psychological distress.

Chapter VI: Healthcare utilization and financing among the elderly

This chapter provides an overview of healthcare utilization and financing pattern among the elderly.

Chapter VII: Effect of elderly abuse on morbidity and disability

This chapter deals with the determinants of elderly abuse and its impact on morbidity and disability. Two step logistic regressions have been performed. At first, logistic regression is used to see the impact of various socio-economic variables as well as social adjustment

score on elderly abuse. Then the adjusted effect of elderly abuse on morbidity and disability controlling other socio-economic covariates has been seen.

Chapter VIII: Correlates of life satisfaction

This chapter explains various covariates related to LS amongst the elderly. The framework of the study is partially derived from Coke & Twaite and Naugarten et al., 2012.Analysis was conducted using hierarchal multiple regression analysis by gender as it is an important determinant and plays an important role in defining LS among the elderly.

Chapter IX: Executive summary and conclusions

This chapter presents the summary of the results, recommendations and scope for future work in the area of gerontology.

1.7 Review of previous studies

1.7.1 Socio-economic inequality in health and multi-morbidity among the elderly

The progression of ageing leads to loss of adaptive response towards stress and there is a growing risk of age related diseases resulting in increase in age specific mortality (Dev, 2001).Existing data shows that at least 50% of the elderly in India have chronic diseases (Bhatt et al., 2011).This implies that ageing population will suffer from chronic medical conditions and the prevalence of multiple chronic conditions is expected to increase (Wolf et al., 2002). Many studies on the prevalence of multi-morbidity in Europe (Uijen et al., 2008; Schram et al., 2008;Marengoni et al., 2008),Middle East(Fuchs et al., 1998), Australia (Britt et al., 2008), United States(Wolff et al. ,2002; Guralnik et al., 1996; Hoffman et al., 1996), Bangladesh (Khanam et al., 2011) and Canada (Daveluy et al.,1998; Rapoport et al., 2004;Fortin et al.,2005)have been carried out, but limited number of such studies have been conducted in developing countries. In India very few studies on the prevalence of multi-morbidity have been carried out (Joshi et al. 2003; Purty et al., 2006).Multi-morbidity becomes progressively more common with age (Sinnige et al., 2013; Walker, 2007; Salisbury et al., 2011; Barnett et al., 2012) and is associated with high mortality (Gijsen et al., 2001), reduced functional status (Kadam &

Croft, 2007; Fortin et al., 2004), and increased use of both inpatient and ambulatory health care (Wolff, Starfield & Anderson, 2002).

Although the association between socio-economic status and prevalence of individual chronic diseases is well established, (Mielcket al., 2014; Marmot, 2005) few studies have examined the association between multi-morbidity and socio-economic status (Walker, 2007; Salisbury et al., 2011; Mercer and Watt, 2007). Limited studies have investigated how diseases distribute or co-occur in the same individual. A study conducted in Australia found that 85% of 70+ year elderly have multi-morbidity and the prevalence is higher among elderly with obesity, female elderly, elderly with low socio-economic status, elderly living alone and less educated (Walker, 2007).

A nested case-control study of general practitioners in South Netherlands Community residents found that the risk factors for multi-morbidity in elderly population included increasing age, higher number of previous diseases, and low socioeconomic status (Sinnige et al., 2013). Few studies have shown the relationship between multi-morbidity, disability and functional decline. A study among Spanish elderly shows that multi-morbidity was associated with impaired functioning (Loza et al., 2009).In contrast another study found that multi-morbidity was not associated with physical activity levels (Hudon et al., 2008). A study on Italians living in community concluded that multi-morbidity affected 4-year mortality, only if associated with disability (Landi et al., 2010). A study conducted on multi-morbidity with healthcare utilization and quality of life among Australian general population found that persons with 3 or more chronic conditions were more likely to feel distressed or pessimistic about their lives (Walker 2007). A research on residential volunteers in Hong Kong concluded that depression prevalence was associated with the number of chronic conditions (Wong et al., 2008). Increasing number of diseases increases hospitalizations, preventable complications, and expenditures (Wolff et al., 2002). Extensive literature review reveals that there is scanty information on the distribution of chronic conditions and multi-morbidity by socioeconomic and demographic factors in India. One of the studies in Chandigarh found out that female elderly were more prone to morbidity (Swami et al., 2002). A Karnataka based study on the prevalence of multi-morbidity concluded that it was equally

distributed amongst elderly men and women (Shraddha et al., 2012). A study in Varanasi found that the common morbidity was Arthritis with overall prevalence of 57.08% followed by Cataract (48.33%), Hypertension (11.25%). Though the prevalence of old age related morbidities increased with advancing age, however, variables like caste, literacy and socio-economic status did not show significant association with the prevalence of multi-morbidity (Shankar et al., 2007).

1.7.2 Interrelationship between morbidity, disability and psychological distress

The interrelationship between morbidity, disability and psychological distress among elderly is an emerging issue. The literature suggests that as morbidity increases there is also increase in disability status and psychological distress (Coelho et al., 2015). Disability is generally associated with chronic conditions such as: Heart diseases, Strokes and Diabetes Mellitus (Guralnik, 1997).Loco-motor disabilities are the most prevalent type of disabilities affecting all ages in India (Patel, 2009). While loco-motor and speech disability was common in early age, visual and hearing disability occurred with advanced age. Other factors which predicted disability amongst elderly are psychological distress, multi-morbidity, depression, low physical activity, poor self-perceived health, chronological age and vision impairment (Kending et al., 2014).

The comprehensive understanding of disability requires linking functional disability with the underlying disease causing it. Though much work is done on physical functioning and disability, not much attention has been given to the specific disorder causing the disability (Guralnik et al., 1992).The best preventive measure is to reduce the prevalence of those chronic medical conditions that lead to functional impairment (Boult et al., 1994).The association of diseases and disability can be studied from two perspectives, one, by investigating the statistical relations between diseases and disabilities and secondly, by exploring the major causes leading to disability. Functional Status indicates the ability to carry out the daily activities in a normal or accepted way (Milla´ n-Calenti, 2006).Maintenance of this functional status is a good indicator for health in the elderly. If any elderly loses this functional status its main cause is rise in morbidity (Stuck et al., 1999). Once the person loses his/her functional status it also restricts social interaction

and hinders the overall quality of life for the elderly (WHO, 2001; Milla´ n-Calenti et al., 2000).Literature shows that functional disability, age and gender have been used as a risk factor for morbidity and mortality among many elderly communities (Carey et al., 2004).

Studies suggest that men develop functional disability earlier and more rapidly than women (Sauvaget et al., 1999). Women, however, spend a longer duration with functional difficulty than men due to longer life expectancy (Strawbridge et al., 1992).Other factors which predicted functional decline amongst elderly were psychological distress, multi-morbidity, depression, low physical activity, poor self-perceived health, chronological age and vision impairment (Stuck et al., 1999). A study from northern India, showed about 42.5% elderly had multiple health-related morbidities and a higher number of morbidities were associated with greater disability and psychological distress (Joshi et al., 2003).

1.7.3 Pattern of healthcare utilization and financing

The fundamental goal of the healthcare system is to ensure that its population should have access to high quality care for maintaining good health status. In the coming decades, it is forecasted that, the burden of chronic diseases in low and middle income countries (LMIC) will increase due to transitions in demographic aging pattern. The healthcare systems and services available in LMIC are often inappropriate to cater to the needs of their aging populations. Aging is directly or indirectly associated with increase in the prevalence of disease and disability (Mathers et al., 2006). Increase in age causes several problems related with the physical and mental well-being (Young, 1997; Bhatia et al., 2007).

Healthcare financing systems such as degree of reliance on Out of Pocket Expenditure (OOPE) plays an important role in the process of financial protection (Xu et al., 2007). Poorer and elderly households face more financial risk and they need more protection in order to benefit fully from the health care services (Su et al., 2006, Habicht et al., 2006; Cavagnero et al., 2006). Elderly with chronic diseases require continuous treatment over a longer period of time but in case of little or no personal income they suffer from financial hardships (Beaglehole et al., 2008; Prince et al., 2008). Medical care of elderly

population is more expensive due to severity of disease and frequent episodes of hospitalization (Reinhardt, 2003). Literature also recognized higher per capita healthcare expenditure among elderly population. It is expected that in the coming decades healthcare cost will increase sharply, especially among vulnerable groups such as females and older adults (Fuchs 1999; Yip &Mahal 2008; Mohanty et al., 2014).

Universal coverage of health includes financial protection with focus on access to health care. It is not that easy for the households to cope up with the Out of Pocket Expenditure (OOPE) as it can result into financial hardships and poverty. Micro level studies suggest that health payments changes with household characteristics. Catastrophic health expenditure is a key measure of the financial protection as it indicates the extent to which the households are protected from unjust payments (Murray et al., 2003).

Most of the literature available from the developed countries provides linkages of population ageing and health spending. These studies recognize a higher per person expenditure among elderly, increase in age-sex specific health care expenditure and expected increase in health care cost in the coming decades (Bloom et al., 2010).Like many developing countries, India is undergoing rapid demographic and epidemiological transition. The Non-Communicable Diseases (NCDs) accounted for 42% of total deaths in 2002 and is likely to increase in future. Owing to the challenges of epidemiological transition (causing predominance of NCDs) and changing age structure towards a visible ageing population, the health care implications are manifold.

There has been increased political involvement and commitment to increase public spending on healthcare in India. The allocation of public spending according to the increasing healthcare needs of the population is of prime significance. The High Level Committee Expert Group (HLEG) on health has recommended increasing central government health spending from 1.1% of GDP in 2008-09 to3% of GDP in 2020 (MOHFW 2009; HLEG 2011). The current pattern of healthcare spending in India suggests that 71% of health expenditure is met by households, 20% by Government, 6% by firms and 2% by external flows (MOHFW 2009). While there has been an increase in government health spending over the years, their focus primarily remains on maternal

and child health. It is projected that by 2030, 45% of India's health burden will be borne by the older population (WHO, 2010).A systematic analysis on the household health expenditure on elderly will help in formulating evidence based policies.

Household expenditure on health care, mainly direct expenditure on health is related to the public spending on health i.e., direct expenditure reduces with increase in public spending on health. Limited studies are available which focuses upon the health-spending pattern among the elderly in India. This study is an attempt to fill this gap as it aims to examine the health care spending (Total health expenditure, Inpatient Expenditure, Outpatient expenditure) among the elderly population.

1.7.4 Elderly abuse and its effect on morbidity and disability

Incidence of elderly abuse is growing and it has become a significant issue in the area of global health (Phelan, 2011).Numerous researchers in abuse literature indicate that women tend to be at higher risk than men and suffer the most awful form of abuse, particularly physical and sexual abuse (Ferreira et al., 2005).Studies indicate that abuse among elderly can co-exist with depression, distress, anxiety, social isolation and low social supports (Taylor et al., 2014).Some studies reveal that the abused elderly have poor physical and mental health and even shorter survival (Dong, 2013).

Many Western studies concluded that the significant predictors of elderly mistreatment were frailty, economic dependency, older age, impairment of ADLs, and cognitive deficits (Comijs et al., 1999; Saveman et al., 1999; Soeda &Araki 1999). A study by Soeda &Araki (1999) demonstrated that 42.4% of abused elderly were having dementia and they were more abused than normal adults. They also found out that between 72% abused elderly were totally dependent on their caregiver.

In Canada, ecological studies reported that communities with high rates of referral for cases of abuse of the elderly were from lower socio-economic status (Vida et al., 2002). In Taiwan, Chung and Jang (2000) analyzed the characteristics of 85 elderly people found that female gender, age 75 years and older, being widowed, living at home with

adult children and grandchildren, bad physical health, economically dependent, and having low IADL and ADL score were significantly correlated to abuse of the elderly.

Abuse is a multidimensional phenomenon requiring psychological, medical, social, political and legal interventions and actions (Wolf, 2000; Kurrle, 2004). Abused elderly people usually hide abuse due to stigma and shame. The depression caused due to abuse leads to various psychological problems and the elderly find it difficult to adjust with the society. However, limited research has been conducted both in India and abroad on the modes of frustration, social adjustment and needs of people in different stages of the life cycle (Raju, 2011). The factors influencing adjustment in old age may be listed as deteriorating condition of health, living conditions, economic conditions, social isolation, social security and medical care (Hurlock, 1976). Aged individuals need to make fresh adjustments in the older years due to change in their role in the family or society (Landis, 1942; Jamuna, 1984). As the aged males are physically "retired" and psychologically it involves loss of income, occupational identity, and social status, this leads to greater dissatisfaction in life resulting in low social adjustment than females (Nathawat &Rathore, 1996). Over two decades of overseas research has confirmed the significance of elderly abuse as a social, medical and legal problem (Kurrle, 2004). Elderly suffering for any health issues be it mental or physical are dependent on their care taker and are victims of abuse (Raju, 2011). Some of the studies in India also indicate that women are more subjected to both physical and verbal abuse (Rao, 1995; Raju, 2002).

1.7.5 Covariates of life satisfaction

According to (Shin & Jhonson, 1978), Life satisfaction (LS) is an important component of successful aging. This refers to a judgmental process, in which individual access the quality of their life on the basis of their unique set of criteria. Elderly individuals tend to be more sensitive to their LS and health conditions, depending on their socioeconomic situations, as they tend to have relatively limited work performance (Lee & Jeon, 2005).

Life satisfaction is a subjective indicator of well-being and is related to health, morbidity and mortality (Stalbrand et al., 2007).This is one of the main determinants of well-being,

which reflects the cognitive judgmental aspect of an individual (Diener et al., 1985). Older people who experience bad health tend to express low level of LS. By contrast, the elderly people having higher socioeconomic status, receiving adequate family support, satisfied with one's living environment/condition, and staying in one's own home plays a crucial role in achieving successful ageing (Riediger, Freund & Baltes, 2005; Chou & Chi 2002). As per the WHO, four factors directly affecting LS of elderly are physical health condition, mental health condition, social relationship and environment (Efklides et al., 2003). For developing LS among the elderly, it is necessary to consider factors like, satisfaction in residential environment, satisfaction in neighborhood relationship, satisfaction on economic status, satisfaction in maintaining friendship, satisfaction in family relationship, satisfaction in physical health condition, satisfaction in marital status satisfaction in job or career, and lastly, satisfaction in others aspect of life(Han & Hong 2010).

A study of LS by (Ferring et al., 2004) found slight negative effects of age on general LS, and slightly higher LS for men. A study found that neither age nor gender was positively associated to LS (Subasi &Hayran, 2005). A large study in 25 European countries on LS found that income has minimal effect on LS (Delhey, 2004). A study on relationship between age and life-satisfaction in 27 years (1928 to 2009) in Estonia, Finland, Latvia and Sweden in a research titling "Does life-satisfaction changes with age?" Their sample included 39420people between the ages of 15 to 100. The results revealed that contrary to Finlanders and Swedish, the relationship between age and LS can be clearly described by a curve in Stovenia and Latvia young and old people have higher life-satisfaction compared to other age-group (Realo &Dobewall, 2011). In addition, (Post et al., 1998) in a research titling "the predictors of mental situation and life-satisfaction" found out that age is a predictor of life-satisfaction. Time-varying physical health is related to changes in LS (Mroczek & Spiro, 2005).

However, physical disability was not found to be related significantly to LS in the Taiwanese elderly (Hsu, 2009). Psychological health is usually related to subjective well-being, and previous studies report a significant relationship between depressive

symptoms and both cognitive function and LS (Berg et al., 2006; Rabbittet al., 2008; Hsu, 2009).

A multivariate structural model on LS was developed and they also found moderate positive effects of socioeconomic status, including income and educational level, on LS (Ferna´ ndez-Ballesteros et al., 2001).A study revealed statistically significant effects of educational level on LS (Subasi & Hayran, 2005). According to (Sener et al., 2008) LS among female elderly tend to depend on educational background. A research also proved that the following social support systems would have positive impacts on the elderly's LS such as education, marriage, occupation, active daily life status, living arrangement, diet, transportation, and emotion (Yeh, 2004). Change in marital status is related to the LS trajectory (Mroczek &Spiro, 2005), and new widowhood is related to morale and social engagement (Bennett, 2005). Women and men in formal marriages experience higher levels of LS than do people in other marriage status (Evans & Kelley 2004). Few studies believe that five factor of personality traits could explain one of third variance in LS (Wood et al., 2008).

There is a strong positive relationship between psychological well-being and LS (Keyes et al., 2002). Psychosocial variables strongly related to LS are size of social network, social support and positive social relations (Antonucci et al., 1996). There is a statistically significant correlation among the factors of wellbeing and LS (Villar et al., 2005). These relationships were moderate to large for self-acceptance, purpose in life and personal growth, but low for autonomy, environmental mastery and positive relations with others. Family support is related to psychological well-being for the Chinese elderly (Deng et al., 2010). Family support has a greater effect on happiness when family income is lower (North et al., 2008), and emotional support has been found to buffer LS during traumatic periods (Krause, 2004). For the Japanese community-based elderly, relationships with friends are more important to the LS (Ho et al., 2003). Continued working and participating in volunteer activities or community events also are related to higher subjective well-being (Warret al., 2004; Kawamoto et al., 2005; Pinquart &Schindler, 2007; Schwingel et al., 2009).

Various studies indicate social network as a factor which a strong influence on the elder's LS (Pinquart &Sorensen, 2001). Psychological variable and locus of control affects subjective well-being more than social network, and pointed to the need for multivariate analysis to increase understanding of the variation in the explanatory variables and LS in elderly individuals (Landau &Litwin, 2001). Most of the research mainly utilized ADLs and IADLs to be the indicators to evaluate the elderly health condition and LS. Physical activities, including ADL are related to LS (Markides & Martin, 1979). Functional capacity of LS is measured through ADL viz. bathing, dressing and undressing, toileting, continence, movement and food intake (Asberg & Sonn 1988).

In India, a study focused on LS and influence of demographic factors on LS of the elderly people. They concluded that majority of the respondents for the study had low level of LS. Moreover, the demographic factors namely gender and habit of savings influence the level of LS of the respondents. The variables viz. health problems, ownership of house, ownership of land, religion, monthly income and number of children does not influence the level of LS (Maheswaran & Ranjit, 2013). A study on relationship between LS and alienation in the district of Kerala, India indicated that elderly men experience less alienation in comparison to the elderly women. Moreover, both elderly male and female do not exhibit significant differences in their LS (Balachandranet et al., 2007). A study conducted in rural Karnataka, India explored the pattern of social support system and LS amongst the elders. The research revealed that family support is a significant factor for the better psychological well-being of elderly. It was also observed that homebound elderly had more advantages than the institutionalized elderly did, in respect to daily activities, level of satisfaction, social support and source of financial support (Marpady et al., 2012).

1.8 Indian scenario

Health and well-being has a significant impact on economic security, level of independence and social interaction among the elderly (Bloom et al., 2010). Longitudinal Ageing Study in India (LASI) puts an effort to understand the economic, social, psychological, and health aspects of adults and the ageing process (Arokiasamy et al., 2012). One-fourth of the elderly were found to be underweight and one-third had

undiagnosed hypertension. About 60% elderly lacked access to basic amenities of safe drinking water and sewer system. Majority of households used poor-quality cooking fuel which was responsible for indoor pollution and resulted in lung diseases (Arokiasamy et al., 2012). Studies also indicate an association between higher SES and increased risk of Hypertension, leading to Cardio Vascular diseases (Lee et al., 2011). A study in Odisha showed that age, state of economic independence and life style indicators are the most important measured predictors of multi-morbidity (Banjare and Pradhan, 2014). Elderly belonging to higher SES were in a better control of their Blood Pressure than respondents with lower SES. Other NCDs associated with old age were Diabetes and Dementia. Females were found having lower cognitive function than the males (Baker et al., 2009).

In India, about 55% of the elderly rate their current health status as poor (UNFPA, 2012).About 50% of the elderly in India has chronic diseases (Bhatt et al., 2011). The morbidity profile clearly shows that the elderly experience a greater burden of illnesses compared to other age groups, across genders and residential location (NSSO, 2006). This implies that ageing population will suffer from chronic medical conditions and its prevalence is expected to increase (Wolf et al., 2002).

The major cause of morbidity and mortality in country like India is NCDs. The epidemiological transition is causing increase in morbidity among the elderly in India (Arokiasamy et al., 2015). With changing environment and modernization, elderly are facing problems which they never faced earlier (Gupta and Sankar, 2002; Rajan and Prasad, 2008). Female elderly are facing higher burden of diseases in comparison with their male counterparts. However, in terms of health seeking behavior, males are utilizing more healthcare services in terms of hospitalization as compared to females (Rajan and Sreerupa, 2008).

1.9 Ageing scenario of Odisha

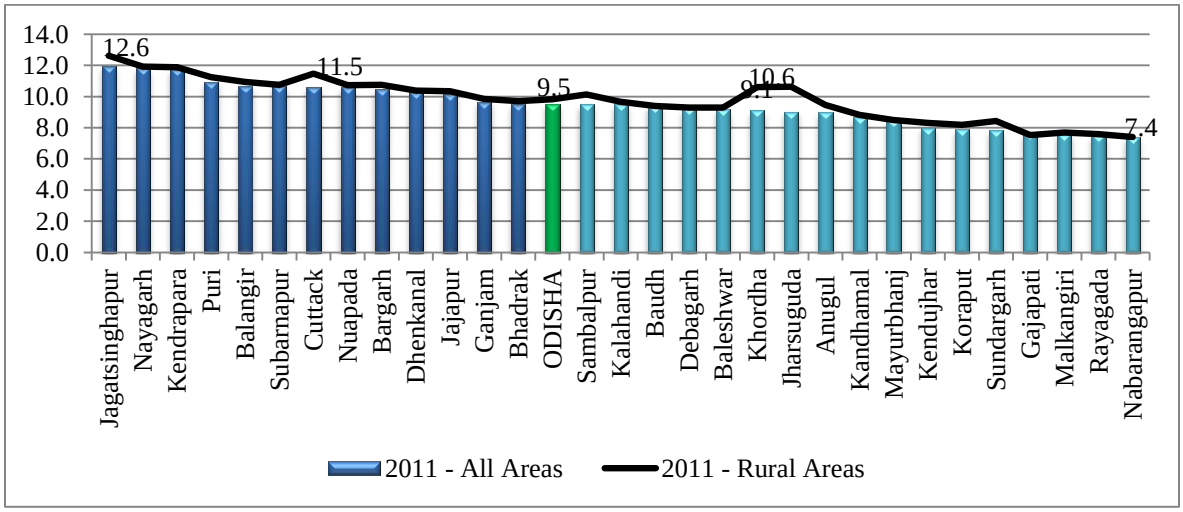
Odisha is one of the poorest states of India, and increase in the proportion of elderly population in Odisha is a matter of concern. A standard way of looking at the burden of ageing for any society is the old age dependency ratio which has increased from 12.7% in

1991 to 16% in 2011. Odisha is characterized with the fourth highest old age dependency ratio among Indian states.

Evidence from the Census reveals that aged population in Odisha is on the rise both in absolute and relative terms. The number of elderly (60+ years) which was 22.81 lakhs in 1991 grew to 30.39 lakhs in 2001 and further to 39.8 lakhs in 2011. As per the 2011 Census, about 9.5% of population in Odisha consists of elderly which is higher than the national average of 8.6%. Around 86% of the elderly are living in the rural areas. The elderly in a poverty ridden state like Odisha are more vulnerable and in this context, the issue of social security assumes greater significance. To understand the current state of overall SWB among the elderly, an examination of morbidity patterns, disability status, abuse faced by elderly, and their LS is necessary.

There is a notable difference in the percentage of old age population at the district level in rural Odisha. It is highest in Jagatsinghpur (12.6%) and lowest in Nabarangapur (7.4%). The following figure 1.3 shows the percentage of old age population at the district level in rural Odisha. The study was conducted in Bargarh district where the percentage of elderly population is higher than the state average. Moreover the ratio of female elderly population was higher in the district than the male elderly population (Census, 2001).

Figure 1.3 District – wise percentage of population aged 60+ years,2011



1.10 Need for the study

As there is a rapid decline in the joint and extended family system in India, the communities no longer protect the rights of the elderly as they used to do in the past. This makes the elderly largely displaced in the community and they are more vulnerable to isolation, deteriorating health leading to disability and psychological distress, elderly abuse and lower LS. The issue of health inequalities, prevalence of morbidity, disability and psychological distress, elderly abuse and overall well-being is neglected especially among the rural population. It has been acknowledged that SWB is a necessary condition for a good life at the personal as well as societal level.

Most of the studies on elderly in India discusses about the prevalence of morbidity and disability but these studies lacks in terms of highlighting the main correlates of multi-morbidity with other socio-demographic variables. The association of specific chronic conditions, leading towards disability and psychological distress are also ignored. Healthcare utilization and financing among elderly is also an unnoticed area. There are few studies which discuss about healthcare expenditure patterns among elderly but they have neglected other factors such as (socio-demographic characteristics, state of economic independence and cognitive health) which influence the financing pattern among them. Patterns of health care utilization and health care financing play an important role for the well-being among the elderly population. Utilization pattern of healthcare services determines the expenditure pattern. If the elderly choose public source of healthcare than in that case expenditure is less but if he goes for private healthcare provider the expenditure increases. In case of lack of financing options elderly households have to spend from their own pocket resulting in higher OOPE and adverse health outcomes. Healthcare expenditure can be catastrophic in the nature, leading towards impoverishments and debts trap. Better financing mechanism can improve health outcomes among the elderly population and can result into positive LS, and promotes overall SWB. Studies on elderly abuse in India have discussed about the prevalence and type of abuse but limited information is available on the effect of abuse on morbidity and disability among the elderly population. Similarly, limited literature talks about the concept of LS among the elderly but they have not thoroughly addressed the other correlates of LS like social adjustment, social support and cognitive health.

The issues of health inequalities, prevalence of morbidity and disability, health care financing patterns, elderly abuse and overall life satisfaction are the areas which need more attention as they can help in understanding the perspective of elderly life in a rural set-up.

1.11 Research objectives

The study is carried out with the following objectives:

1. To assess the prevalence of multi-morbidity and socio-economic inequalities in various chronic health conditions among rural elderly.
2. To examine the association of morbidity with disability and psychological distress.
3. To analyze the pattern of healthcare utilization and financing among the elderly.
4. To examine the association of elderly abuse with morbidity and disability.
5. To examine the various covariates of life satisfaction among the rural elderly.

1.12 Hypothesis

Based on the literature review, following hypotheses have been formulated and all hypotheses have been tested in a broader perspective.

H1: Life style indicators do not have significant effect on the occurrence of multi-morbidity.

H2: Prevalence of multi-morbidity is higher among female elderly.

H3: Socio economic variables like caste, marital status and living arrangement have a significant impact on multi-morbidity.

H4: There is a positive association-ship of morbidity with disability and psychological distress.

H5: The State of economic independence has no association with higher mean health care spending among the elderly.

H6: Elderly prone to unhealthy life style deemed to spend more.

H7: There is no significant relationship between elderly abuse and their morbidity and disability status.

H8: Social support has no significant impact on the LS of elderly.

H9: Disability status among the elderly has no significant impact on their LS.

H10: Elderly having no risk behaviors are having better LS.

CHAPTER II

MATERIALS AND METHODS

This chapter describes the sources of data and various methods used in the analysis of data.

2.1 Study area

The study is undertaken among the rural elderly in Bargarh district of Odisha, India. The district lies between 20° 43' to 21° 41' North latitude and 82° 39' to 83° 58' East longitude (figure 2.1). The district has an area of 5837 Sq.Kms. The population of the district as per 2011 census was 14.81 million (Male - 7.49 million and Female - 7.32 million). Agriculture is the main economic activity in the district. Apart from agriculture, allied activities like diary, poultry, goatery and piggery are also popular. Concentration of handloom weavers is found in few pockets of the district. Besides, there are potters, blacksmiths and construction workers in the district. In Bargarh district of Odisha about 10% of the population belongs to old age group and the percentage female elderly are significantly higher than the percentage male elderly (Census, 2001).

Figure 2.1 Map of Bargarh district, Odisha

Source: Government of Odisha, 2011.

2.2 Sampling

A cross-sectional survey using multi-stage random sampling procedure was conducted among the rural elderly (60+ year) in Bargarh District of Odisha during November 2012-February 2013. The targeted sample size was 320. Data were collected through face-to-face interviews with a pre-tested structured questionnaire. Ten respondents who were extremely frail could not respond to the questionnaires. So, finally 310 respondents were considered for analysis resulting in a response rate of 97%. Verbal consent was obtained before conducting the survey. Quantitative survey was conducted with a well pre-tested questionnaire. SPSS 20 and STATA 12 software packages were used to analyze the data.

2.2.1 Sample size

The sample size was estimated by using the key variable i.e. proportion of elderly having morbidity (43%) (NSSO, 2006). The following formula was used to get the optimal sample size.

$$n = \frac{z^2_{1-\propto/2} P(1-P)}{d^2}$$

Where,

n= estimated sample size

$z_{1-\alpha/2}$ =1.645 (90% confidence interval)

d=0.05 (precision)

p=0.43

Using the above formula the estimated sample size was270 (95%CI:±5.9). So the study proposed to collect information from 320 respondents. Finally the achieved sample size was 310 after excluding incomplete and rejected questionnaire. In order to increase the efficiency of estimates, a multistage sampling design was followed to select required number of respondents for interview. Block was selected at the first stage. Then villages were selected at the second stage followed by selection of targeted respondents at the third stage.

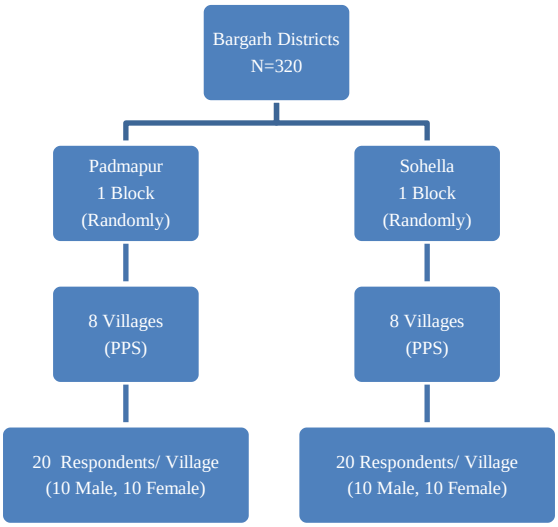
*Stage I: Selection of Block:*As per Census 2001, Bargarh district consists of two sub divisions viz; Bargarh and Padmapur. Each subdivision has 6 Blocks (*Bargarh:* Bargarh, Barpali, Attabira, Bheden, Sohella, Bijepur; *Padamapur:* Padmpur, Gaisilet, Paikmal, Jharbandh, Ambabhona and Bhatli). One block was randomly selected from each

subdivision. As per census 2001, total number of village in Bargarh was 1207. In this study Sohella and Padampur blocks were selected for the field survey. The number of villages in Sohella and Paadmapur were 93 and 71 respectively.

Stage II: Selection of Villages: Twenty respondents were selected (10 Male and 10 Female) from each village. Thus 16 villages (8 from Padmapur Block and 8 from Sohella Block) were selected by using probability proportion to sample size (PPS) as shown in Figure 2.2.

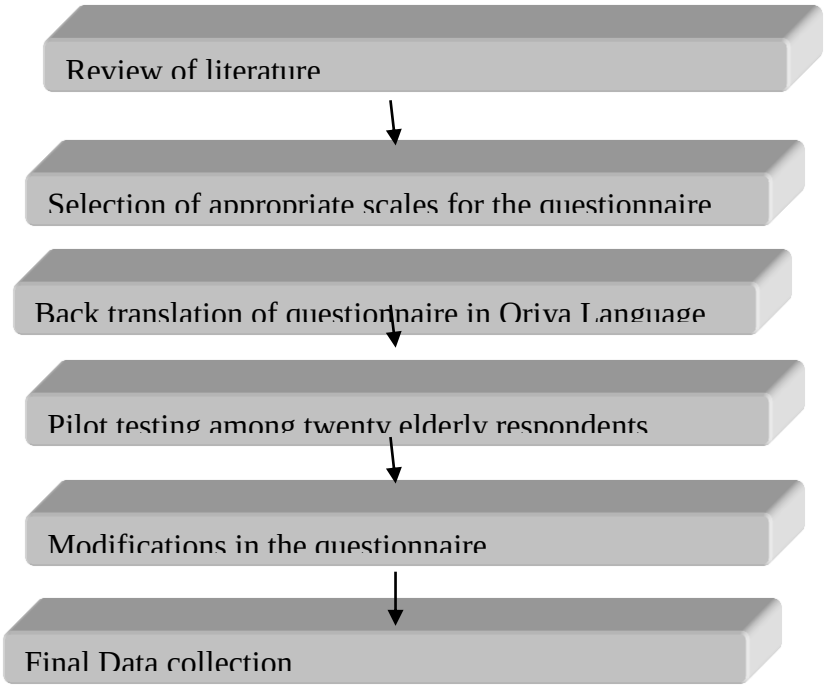
Stage III: Selection of Respondents: At the village level, a sampling framework was prepared separately for male and female respondents. A complete listing of the households was done in a selected village. During the listing in each household all the members age 60+ were listed. Each member's actual age and gender were noted. Using these details separate sampling frame was developed for both male and female respondents. From these lists target respondents were selected using systematic random sampling procedure. Systematic random sampling is the random sampling method that selects samples based on a system of intervals in a numbered population. Systematic random sampling method involves two steps process. First, a random number will be selected; second, an equal interval will be calculated to select required number of respondents. For example if there are 30 male elderly in a village, then the interval for sample selection would be 30/10=3. Suppose the random number is 2. Then, 2^{nd}, $(2+3)5^{th}$, $(5+3)8^{th}$, …….and so on will be selected for the interview. All efforts were made to interview all the selected respondents. As far as research knowledge and experience in such type of surveys shows that around 10 percent respondents either are not available during the survey period or refuse to participate in the interview. In case of refusals and non-availability of selected respondents, additional respondents were selected using systematic random sampling procedure.

Figure 2.2 The overall sample size distribution



The process of data collection is shown in Figure 2.3. First the detailed literature review was done to find various literature gaps of the elderly population .Secondly various appropriate tools were finalized to access various health conditions and other important aspects required for the study. As the study was conducted in rural Odisha the most important part was to get the translation done of the questionnaire in the local language of Oriya to make it more user-friendly. After the translation pilot testing was done in a nearby village to see the flow and consistency of the questionnaire. Finally the required changes were incorporated, pre testing was done and final data was collected.

Figure 2.3 Process of data collection



2.3 Scales use in the study

In this thesis various types of scales were used to assess the disability status and psychological wellbeing among the rural elderly in Odisha. Functional status can be conceptualized as the ability to perform self-care, self- maintenance and physical activity. Though there are many different areas of functional status such as social function, cognitive function and occupational function, however for in this thesis we will be looking at two different scales that asses function as a physical disability. Function is usually classified into two types: Instrumental Activities of Daily Living (IADLs) and basic Activities of Daily Living (ADLs). Normal aging changes and health problems are often reflected in declines in the physical abilities of the elderly, which can render them less independent, creating problems in their day to day tasks. One of the methods to assess the physical health status of older adults is through functional assessment. The scales used in this thesis are described below.

2.3.1 The Lawton Scale

The Lawton IADL scale was developed by Lawton and Brody in 1969 to assess the more complex ADLs necessary for living in the community. Competence in skills such as shopping, cooking, and managing finances is required for independent living. Because IADL function is usually lost before ADL function (such as bathing, eating, and using the toilet), assessment of IADLs may identify incipient decline physical, cognitive, or both in an older adult who might otherwise appear capable and healthy. The Lawton IADL scale takes 10 to 15 minutes to administer and contains eight items, with a summary score from 0 (low function) to 8 (high function).

The Lawton IADL Scale was originally tested concurrently with the Physical Self-Maintenance Scale (PSMS). Reliability was established with twelve subjects interviewed by one interviewer with the second rater present but not participating in the interview process. Inter-rater reliability was established at 0.85. The validity of the Lawton IADL was tested by determining the correlation of the Lawton IADL with four scales that measured domains of functional status, the Physical Classification (6-point rating of physical health), Mental Status Questionnaire (10-point test of orientation and memory), Behavior and Adjustment rating scales (4-6-point measure of intellectual, person,

behavioral and social adjustment), and the PSMS (6-item ADLs). The scale has been already used in the WHO-SAGE study, in Indian context.

2.3.2 Katz Index of independence in activities of daily living (ADL)

In aging changes and health problems frequently show themselves as declines in the functional status of older adults. One of the best ways to evaluate the health status of older adults is through functional assessment which provides objective data that may indicate future decline or improvement in health status. The most appropriate method or tool to access activities of daily living of the elderly is the Katz Index of Independence in Activities of Daily Living, commonly referred to as the Katz ADL. It was developed by a medical doctor Sidney Katz In 1969.The Index ranks adequacy of performance in the six functions of bathing, dressing, toileting, transferring, continence, and feeding. Clients are scored yes/no for independence in each of the six functions. A score of 6 indicates full function, 4 indicate moderate impairment, and 2 or less indicates severe functional impairment.

The Katz Index of Independence in Activities of Daily Living, commonly referred to as the Katz ADL, is the most appropriate instrument to assess functional status as a measurement of the client's ability to perform activities of daily living independently. Clinicians typically use the tool to detect problems in performing activities of daily living and to plan care accordingly.

2.3.3 The General Health Questionnaire (GHQ)

The General Health Questionnaire (GHQ) first introduced by Goldberg (1972) is one of the most commonly employed measures of mental health. The original development of the measure involved a 60 item version (GHQ-60). Subsequently there two reduced version of GHQ i.e. GHQ-30 and GHQ-12. GHQ-12 is used in this study. The GHQ covers current symptoms of distress and demoralization and is designed to identify individuals at high risk of having a diagnosable emotional disorder.

The questions are like (*have you been able to concentrate on whatever you are doing?*) and others related to mental health. The answers are in Yes or no format. The questions are framed both positively and negatively, for each positive question if the respondent

marks yes it was counted as 1 or else 0 and for every negative question if the respondent marked yes it was counted as zero and if he/she marked no it was taken as 1 , so the score ranged from 0 to12.

Since the GHQ-12 is a brief, simple, easy to complete, and its application in research settings as a screening tool is well documented; it was decided to translate the GHQ-12 into Oriya language and to examine the psychometric properties of the questionnaire in a sample of rural elderly Odisha, India. There is evidence that the GHQ-12 is a consistent and reliable instrument when used in general population samples (Montazeri et al., 2003). The standard "forward-backward" procedure was applied to translate the questionnaire from English into Oriya. Subsequently it was back translated into English and following a careful cultural adaptation the final version was provided. Finally after pilot testing, the translated questionnaire was administered to a sample of rural elderly at Bargarh district of Odisha.

2.3.4 Social Adjustment Scale

For social adjustment the scale is inspired from Hugh M. Bell Adjustment Inventory which contains one hundred and forty items considering both adjustment inventory and social adjustment. Out of which fifteen items related to the target population and Indian scenario were figured out and taken into consideration regarding the sample and environment in which they live. The Adjustment Inventory (questionnaire) is intended for advisory work and complex psychological diagnostics. The questionnaire by Hugh M. Bell allows to estimate six specific areas of personal and social adjustment and to obtain more realistic information from the individual concerning what one thinks and feels about one's functioning body; one's friends acquaintances outside the home; one's family relationships; how aggressive or retiring one is; how much trust one can have in people around; how well one has come to pay the roles that the society expects. Here we have taken questions related to oneself and his adjustment with the society.

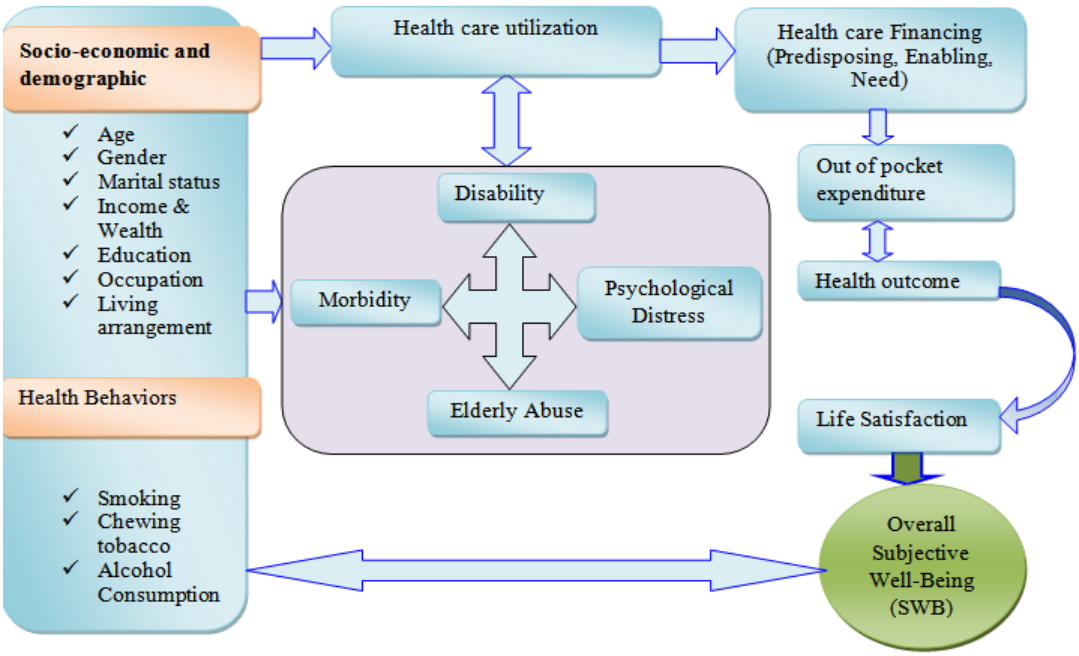
The questions were both positively and negatively framed and the respondent has to mark Yes or No according to his wish or concurrence with the question. If the respondent marked ‘yes’ for the positive question it was taken as 1 and if he/ she marked ‘yes’ for

the negative question it was taken as 0 and if the respondent marked 'no' for the negative question it was taken as 1. The total score ranged from 0 to 15.

2.4 Conceptual framework

A Conceptual framework has been developed to study the overall SWB among the elderly population at Bargarh district in Odisha. The various correlates of SWB are health status, psychological well, disability status, financing needs, abuse and LS. These variables are influenced by various socio-economic and demographic characteristics of an individual. These socio-economic and demographic characteristics combined with the health behaviors can define the health and morbidity status of an individual. If a person is in a better socio-economic condition and do not posses any type of risk behavior, free from morbidities, disability, psychological distress and elderly abuse than he can enjoy a better level of LS and overall SWB. If these conditions are not fulfilled then in that case there is an operation of the vicious circle of morbidity, disability, psychological distress and elderly abuse. This circle can be broken with the help of better health care utilization of the available services and adequate financing of the healthcare needs of the elderly population.

Figure 2.4 Conceptual framework of the study



2.5 Methodology

The methodology and theoretical framework used in the chapters of thesis is shown in table 2.1.

Table 2.1 Methodological framework

Chapter specific objectives	Theoretical framework used	Methods Used	Dependent variable	Independent variable
To assess the prevalence and socio-economic inequalities in various chronic conditions and morbidity among rural elderly	Commission on Social Determinants of Health (WHO, 2010)	Logistic regression	Morbidity	Age Gender Marital status Education Wealth quintile Caste State of economic dependence Living arrangements Life style indicators
To examine association of morbidity with disability and psychological distress.	Social model of disability- Mike Oliver (1992)	Chi square test Logistic regression	Disability ADL IADL Psychological distress	Morbidity Gender Marital Status Living arrangements Caste Education Age Wealth quintile State of economic dependence Occupation
To analyze the healthcare utilization and financing among the elderly	Anderson model of healthcare utilization, 1995	Generalized Liner Regression Model (GLM)	Out of pocket Expenditure (OOPE)	Predisposing factors (Age Gender Marital status, social groups Living arrangement) Enabling factors (education, income, morbidity, state of economic dependence, economic needs) Need Factor (risk behavior, Functionality, cognitive health, Physical disability
To assess the effect of elderly abuse on morbidity and disability.	Ecological Bi-focal model- Heydrich et al.,2012	Logistic regression	Morbidity Disability	Elderly abuse Social adjustment Social support Education Wealth quintile Caste State of economic dependence Living arrangements Gender Age Marital status
To examine various covariates of life satisfaction among the rural elderly.	Coke &Twaile and Naugarten et al., model of LS	Hierarchical regression	Life Satisfaction	Age Marital status Education Wealth quintile Caste State of economic dependence Living arrangement Lifestyle indicators Activities of daily living (ADL) Social networks Disability Cognitive health Number of morbidities

2.5.1 Logistic regression

The logistic regression model is commonly used when the independent variables include both numerical and nominal measures and the outcome variables (dependent variables) are binary or dichotomous. The advantage of logistic regression analysis is that it requires no assumption about the distribution of the independent variables. Another advantage is that the regression coefficient can be interpreted in terms of odds ratio.

Logistic regression applies maximum likelihood estimation after transforming the dependent into a logit variable (the natural log of the odds of the dependent occurring or not). So, logistic regression estimates the probability of certain event whether occurring or not.

The multiple logistic models can be noted as:

$$\ln\left(\frac{p}{1-p}\right) = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + ...\beta_i x_i + e$$

Where, p is the probability of occurrence of multi-morbidity, $p\ (y=1);\ \beta_1,\ \beta_2,\ \beta_3, \ldots$ β_i refers to the beta coefficients; $x_1,\ x_2,\ x_3,\ \ldots x_i$ refers to the independent variables and e is the error term.

2.5.2 Generalized Linear Regression Models (GLRM)

In recent years general linear model (GLM) is a common method of estimating ANOVA and MANOVA models. The GLM is composed of three elements.

- Variate: the independent variables are defined at first then they are assigned estimated weights showing the variables contribution to the predicted value.
- Random component: The probability distribution is assumed to underline the dependent variables which may be normal distribution, binomial distribution, and passion distribution. Random component is selected based on the type of responsible variable.
- Link function: It gives the theoretical connect between the variate and random component to accommodate the differing model formulation. The link function

specifies the type of transformation needed to specify the desired model. The three most common link functions are the identity, logit and log links.

The GLM approach gives a single estimated model within which any number of differing statistical models can be accommodated. The special advantages of GLM are its flexibility and simplicity in model design

In its simplest form, a linear model specifies the (linear) relationship between a dependent (or response) variable *Y*, and a set of predictor variables, the *X*'s, so that

$Y = b_0 + b_1X_1 + b_2X_2 + ... + b_kX_k$

In this equation b_0 is the regression coefficient for the intercept and the b_i values are the regression coefficients (for variables 1 through *k*) computed from the data. The generalized linear model can be used to predict responses both for dependent variables with discrete distributions and for dependent variables which are nonlinearly related to the predictors.

The generalized linear regression model (GLRM) differs from the general linear model (of which, for example, multiple regression is a special case) in two major respects: First, the distribution of the dependent or response variable can be (explicitly) non-normal, and does not have to be continuous, i.e., it can be binomial, multinomial, or ordinal multinomial (i.e. contain information on ranks only); second, the dependent variable values are predicted from a linear combination of predictor variables, which are "connected" to the dependent variable via a link function.

This method is applied to examine the covariates of Out of Pocket Expenditure (OOPE) among rural elderly in chapter VI. The outcome variable OOP health expenditure was typically non-parametric and positively skewed with influential outliers. Traditional ordinary least square (OLS) regressions with log-transformation and retransformations are too inconsistent to handle skewness in the data and provide inferences in natural units of mean expenditures (Manning, 1998). Generalized linear regression models (GLRM) are flexible to handle skewed expenditure data and avoid the issue of outcome transformation (Basu, 2009, Gregori et al., 2011). Survey GLM with gamma distribution and log link function (Kilian et al., 2002), was employed to assess various determinants

of OOPE and account for the complex survey design. The equations for gamma distribution as follow:

$f(y) = \frac{1}{T(\nu)y}(y\nu|\mu) \exp(-y\nu|\mu)$ for $0 < y < \infty$

$\Phi = \nu - 1$

Scale = ν

Var(Y) = μ^2 / ν

Application of GLM for healthcare financing: A study was conducted among 1202 COPD patients at Kaiser Permanente at USA (Omachi et al., 2013).Using a general linear model (GLM) with a gamma response probability distribution and a log-link function gamma response probability distributions were chosen for analysis.

They analyzed the substantial impact of disease-specific clinical measures have on predicted costs among COPD patients, even after risk-adjustment using diagnosis codes. Although clinical measures need to be made more easily accessible for cost prediction, they convincingly showed that COPD severity measures, in absolute dollar terms, meaningfully impact costs. Incorporating disease-specific measures into risk models is important to encourage providers to accept responsibility for sicker COPD patients. Additionally, incorporating these measures may reduce the financial disadvantages faced by organizations that care for lower SES populations. This is likely to become increasingly important with the growth of accountable care organizations ACOs, expected under the Affordable Care Act, and the application of risk-adjustment more broadly.4 Simultaneously, it is likely to become easier to implement with the growth of electronic health records EHRs. Caution must therefore be taken about the extent to which currently-employed risk adjustment methods may adequately control for disease severity while further work to incorporate clinical measures is conducted.

Another study where two models have been used to address the econometric problems caused by skewness in data commonly encountered in health care applications first was transformation to deal with skewness (e.g., OLS on ln(y)); and second was an alternative weighting approaches based on exponential conditional models (ECM) and generalized linear model (GLM) approaches. This study encompass these two classes of models using the three parameter generalized gamma (GGM) distribution, which includes several of

the standard alternatives as special cases OLS with a normal error, OLS for the log normal, the standard gamma and exponential with a log link, and the Weibull. Using simulation methods, they tested and identified distribution to be robust. The GGM also provides a potentially more robust alternative estimator to the standard alternatives. An example using inpatient expenditures is also analyzed (Manning et al., 2005).

The result of GLRM model was presented in terms of β coefficients. The β co-efficients can be negative or positive. If the β coefficient is not statistically significant (based on p values), no statistical significance can be interpreted from that predictor. If the regression beta coefficient is positive, the interpretation is that for every 1-unit increase in the predictor variable, the dependent variable will increase by the standardized beta coefficient value. For example, if the beta coefficient is .80 and statistically significant, then for each unit increase in the predictor variable, the outcome variable will increase by .80 units.

2.5.3 Hierarchical regression

Hierarchical regression has been designed to test such specific, theory-based hypotheses (Cohen, 2001; Wampold & Freund,1987).In stepwise and simultaneous regression, a common focus is on determining the "optimal" set of predictors, by limiting the number of predictors without significantly reducing the R^2 coefficient. These methods may also be used to examine the degree of standardized unit change in the criterion for every standardized unit change in the predictor variable when holding all other predictor variables in the model constant (at their mean) as indicated by the β coefficient (standardized partial regression coefficient). However, in hierarchical regression, the focus is on the change in predictability associated with predictor variables entered later in the analysis over and above that contributed by predictor variables entered earlier in the analysis (Petrocelli, 2001).

Change in R^2 (ΔR^2) statistics are computed by entering predictor variables into the analysis at different steps. A predetermined, theoretically based plan for the order of predictor variable entry, held at the discretion of the researcher, is imposed on the data. Statistics associated with predictor variables entered in later steps are computed with

respect to predictor variables entered in earlier steps. Thus, ΔR^2 and its corresponding change in F (ΔF) and p values are the statistics of greatest interest when using hierarchical regression (Wampold & Freund, 1987). The process of Hierarchical regression is given below:

Let's assume that the independent variables (IVs) can be placed in a justifiable sequence denoted X_1, X_2, X_3…….X_k. In hierarchical regression analysis at each step in the sequence the next IV in the ordering is introduced to the model. And at each step we assess the increment in R^2over the previous step.

Step 1: Enter X_1 into model.

Equation: $\hat{Y} = B_0 + B_1X_1$

Squared Multiple Correlation (SMC): $R^2\ Y._1$

Interpret effect size and carry out inferential analyses.

Step 2: Enter X_2 into model.

Equation: $\hat{Y} = B_0 + B_1X_1 + B_1X_2$

SMC: $R^2\ Y._{12}$

Increment: $R^2\ Y._{12} - R^2\ Y._1$ This increment is equivalent tosr_2^2 removing the effect of X_1.

Step 3: Enter X_3 into model.

Equation: $\hat{Y} = B_0 + B_1X_1 + B_2X_2\ B + B_3X_3$

SMC: $R^2\ Y._{123}$

Increment: $R^2\ Y._{123} - R^2\ Y._{12}$ This increment is equivalent tosr_3^2 removing the effect of X_1 and X_2.

Interpret this effect size and test significance. Significance test for increment is equivalent to test of B3. This process continues until step k.

Step k: Include all k IVs in the model.

Enter X_k into model. Equation: $Y = \hat{Y} = B_0 + B_1X_1 + B_2X_2\ B + B_3X_3$…… B_kX_k

SMC: $R^2\ Y._{12}\ldots_k$

Increment: $R^2\ Y._{12}\ldots_k - R^2\ Y._{12}\ldots_{(k-1)}$

This last step is equivalent to a full simultaneous analysis. Note that there is no consideration of stopping prior to step k. Even if an increment in R^2 is not significant at a given step, the process continues. Increments at later steps may be larger than increments at earlier steps. The information at each step provides a type of ordered partitioning of the

variance accounted for. That is, the increments at each step will sum to the total R^2. The pattern of results is highly dependent on the ordering of the IVs. If the ordering is changed, the entire pattern of results may change substantially. Thus, the ordering of the IVs must be carefully considered and justified. The ordering of the IVs in hierarchical regression is determined on an a priori basis. It is not data-driven, not based on any analysis of sample data. It can and should be determined before any data are collected or analyzed. Criteria for determining the order of the IVs: 1) Causal priority: Based on prior theory and logic it may be possible to establish a causal sequence of relationships among the variables.

Suppose we hypothesize a sequence of the form X1 → X2 →X3 → X4 → Y. Then that hypothesized sequence defines the ordering of the IVs for the steps of the hierarchical regression. The IVs are entered in the sequence defined by the causal order. In general, when the order of the IVs is defined for hierarchical regression, it should be the case that no IV is influenced by an IV that is entered at a later step.

2.5.4 Estimation of household wealth quintile

In this study the socio-economic status was defined in terms of household assets rather than income. Information on 33 assets[1]was collected as per Demographic Health Survey (DHS) guideline. Each household asset was assigned a weight (factor score) generated through Principal Components Analysis (PCA), and the resulting asset scores were standardized in relation to a normal distribution with mean zero and standard deviation one (Gwatkin et al., 2000).Kaiser-Meyer-Olkin (KMO) was performed to measure the sampling appropriateness. The obtained value of KMO was 0.87, which was adequate for conducting PCA (Othman and Owen, 2001).

A summary household measure called "Wealth Quintiles" was calculated based on the possession of these durable goods (household amenities) following the methodology used

[1] The 33 household asset variables used in the construction of wealth quintiles are: household electrification; type of windows; drinking water source; type of toilet facility; type of flooring; material of exterior walls; type of roofing; cooking fuel; house ownership; number of household members per sleeping room; ownership of a bank or post-office account; and ownership of a mattress, a pressure cooker, a chair, a cot/bed, a table, an electric fan, a radio/ transistor, a black and white television, a colour television, a sewing machine, a mobile telephone, any other telephone, a computer, a refrigerator, a watch or clock, a bicycle, a motorcycle or scooter, an animal-drawn cart, a car, a water pump, a thresher, and a tractor.

in National Family Health Survey (NFHS-3). Possession of each item was converted into a dichotomous variable. For example, if a household had bicycle it was given a score '1' and the household which did not have bicycle was given a score of 0. In case, a variable has more than two values/code categories, then one of them is given value '1' and the rest values were equated to '0'. For instance, in case of type of house the Pucca house was given score '1' and the remaining categories namely semi-pucca and Kachha were given '0' score. Considering all these dichotomous variables, principal component analysis was applied and each of the above household assets was assigned a weight or a factor score derived through the principal component analysis. The Wealth score was determined using the following formula:

$$Wealth Score\ (WS) = \frac{Value\ of\ Wealth\ Variable - Mean\ of\ Wealth\ Variable}{SD\ of\ Wealth\ Variable} \times Wealth\ Factor\ Score$$

In the next step, all the wealth Scores (WS) was added at the household level to get Total Wealth Score for each of the household individually called Household Wealth Score (HHWS). Then the households were ranked according to their individual HHWS and then divided into five quintileswith the same number of individuals in each. This provided us the cut-off points or the ranges for each quintile.

CHAPTER III

SOCIO-ECONOMIC & DEMOGRAPHIC PROFILE OF THE ELDERLY POPULATION

3.1 Introduction

Housing environment has been acknowledged as one of the main settings that affect human health (Hood, 2005). Living conditions of an individual affect their physical, mental, and social health in some way or the other. This chapter provides a background of socio-economic and demographic characteristics of the sampled households of the selected elderly population aged 60 years and above.

The chapter is divided into two sections. Section I deals with the housing characteristics of the sampled households and Section II presents the profile of the elderly living in the sample households. Section I covers four components: (i) housing characteristics which include: type of house, rooms, source of drinking water, sanitation facilities, main source of lightning and cooking fuel; (ii) possession of household assets; (iii) households with BPL cards and (iv) ownership of agricultural land and livestock. Section II provides information on the profile of elderly population: (i) socio-economic and demographic characteristics of elderly; (ii) working status of elderly population; (iii) economic dependency of the elderly; (iv) children staying with elderly; and (v) transfer of assets by elderly.

3.2 Section I: Socio-economic characteristics of sampled household

3.2.1 Housing characteristics

It is important to understand the socio-economic profile of the sampled households, as it has a significant relationship with the level of health and healthcare utilization. The present section provide information on household characteristics and housing conditions that provides a background for understanding the demographic, health, nutritional status, prevalence of morbidity and health care utilization among rural elderly. The housing characteristics of the sampled households are shown in table 3.1.

Table 3.1 Percent distribution of households by housing characteristics

Housing characteristics	Percentage	N
Type of house		
Kuchha	61.6	191
Semi-Pucca	22.9	71
Pucca	15.5	48
Place for cooking		
Inside living room	47.1	146
Separate Room outside	27.4	85
Open space	25.2	78
Others	0.3	1
Source of drinking water		
Tap	18.7	58
Public tap	56.8	176
Hand pump	23.2	72
Well	1.3	4
Sanitation facilities		
Own pit toilet	6.5	20
Shared pit toilet	7.4	23
Public pit toilet	4.5	14
No facility/bush/field	80.3	249
Others	1.3	4
Main source of lighting		
Electricity	58.4	181
Kerosene	41	127
Gas	0.6	2
Cooking fuel		
Wood	93.2	289
Coal/coke/lignite	0.6	2
Kerosene	2.3	7
Liquid petroleum gas	3.5	11
Bio gas	0.3	1
N	**100**	**310**

Result shows that about 61.6% of the population lived in Kuchha houses followed by those living in semi-Pucca houses (22.9%) and Pucca houses (15.5%). More than half of the households had two rooms (54.2%), about 16.8% houses had one room and rest of the households had more than three rooms.

Usage of biomass as a fuel in rural India is a common practice; biomass fuel refers to the use of cheap materials such as wood, crop residues, or cow dung for cooking or heating purposes, mainly in the poorer regions of the world. Results show that majority of the households did not have any separate room for cooking and only 27.4% were having this facility. More than 90% of the sampled households used wood as cooking fuel followed by LPG/natural gas (3.5%), Kerosene (2.3%), coal/coke (0.6%) and biogas (0.3%).

Poor sanitation and unsafe drinking water especially from wells and unauthorized hand pumps can lead to various types of diseases such as: under nutrition, pneumonia, and worm infestations. Use of unsafe water, poor sanitation and hygiene practices can result into reduced physical growth, weakened physical fitness and impaired cognitive function. The results from sampled household's shows that the main source of drinking water is public tap (57%) followed by hand pump (23.2%), tap (18.7%) and well (1.3%). Human excreta have been implicated in the transmission of many infectious diseases including cholera, typhoid, infectious hepatitis, polio, cryptosporidiosis, and ascariasis. Results indicate that about 80% of the population had no sanitation facility and were used to defecate in the open space. Only about 7% of the households were using their own pit toilet.

Studies show a positive relationship between health issues and improved water quality and sanitation (Esrey et al., 1991). Diseases such as Diarrhea and Typhoid are still among the one of the main causes behind mortality in rural India. These deaths can be avoided by improving hygiene and sanitation conditions such as: consuming safe drinking water, washing hands with soap and proper disposal of excreta (Cairncross et al., 2006; Clasen et al., 2007; Fewtrell et al., 2005).

3.2.2 Possession of assets

In order to assess the living standards of the sampled household, information on possession of 33 key household assets was collected by using Demographic Health Survey (DHS) guidelines. The percentages of households by possessions of household assets were presented in Table 3.2. About 56.8% of the households had electricity connection. Only 10% household had a mattress and about 13.5% had pressure cooker. Majority of the households have owned cot/bed (97%), followed by bicycles (69%) and mobiles or telephones (62%).

Table 3.2 Percent distribution of households by possession of assets (N=310)

Household assets	Percentage	N
Electricity	56.8	176
Mattress	9.7	30
Pressure cooker	13.5	42
Chair	37.4	116
Cot/Bed	96.8	300
Table	27.4	85
Electric fan	36.8	114
Radio/Transistor	10	31
Black and white television	19	59
Color television	21.6	67
Sewing machine	5.2	16
Mobile telephone	61.6	191
Any other Phone	3.2	10
Computer	0.3	1
Refrigerator	3.9	12
Watch	31.3	97
Bicycle	69	214
Motorcycle or Scooter	11.6	36
Animal drawn cart	19.7	61
Car	0.3	1
Water pump	6.1	19

3.2.3 Households with BPL cards

Households were also asked if they had a Below Poverty Line (BPL) card, which is issued by the government to those household that fall below the official poverty line. The households possessing BPL card were given subsidized ration food supplies and the card was also used for identification purposes. The findings on the possession and utilization of BPL cards are presented in table 3.3.

Table 3.3 Percentage of household by the possession of BPL card

Status of BPL card	Percentage	(N=310)
Household classified under BPL category	58	180
Do you have BPL card		
Yes,Seen the Card	92	166
Not seen the card	08	14
Availing the benefits of the card		
Yes, fully	60	108
Yes, partially	35	63
Not availing the benefits	5	9

The result shows that about 58% of the population was classified under BPL criteria. Only 60% of them were availing full benefits of BPL card.

3.2.4 Ownership of agricultural land and livestock

Ownership of agricultural land is an important indicator of the socio-economic status of the household. Results shows that about 79% of the elderly households have their own agricultural land and21% had no land (Table 3.5). The analysis of the land holding size shows that about 47% of household have less than one acre. Only 8% of the households had land holding size of five or more acres. The result on possession of livestock shows that cows (44%) were the most common possess animal followed by others i.e. Hen, pigeons, sheep etc. (13.2%), goats (6.8%), and buffaloes (1.3%).

Table 3.4 Percentage of household by ownership of land and livestock

Possession of land	Percentage	N
Own any agricultural Land		
No Land	21.2	66
Having Land	78.7	244
Size of land		
Less than 1 Acre(0 - 1 Acre)	47.3	115
1-5 Acre	45.8	110
5-10 Acre	4.9	10
10+ Acre	3.6	9
Land used for cultivation		
Less than 1 Acre (0 - 1 Acre)	49.7	115
1-5 Acre	45.4	105
5-10 Acre	3.8	9
10+ Acre	0.8	2
Possession of livestock		
Cows	44.1	137
Buffaloes	1.3	4
Goats	6.8	21
Others (Hen, pigeons, sheep etc.)	13.2	41
N		**310**

3.3 Section II: Profile of elderly population

3.3.1 Socio-economic and demographic characteristics of elderly

Table 3.5 presents the socio-economic and demographic characteristics of the sampled elderly population. Total 310 respondents were interviewed out of which 153 respondents were male and 157 respondents were female. The age of the respondents shows that about 65% of elderly belongs to the age group of 60-70 years, followed by 65-70 years (35%), 70-75 years (20%) and 75 & above (14%). About 60% were married followed by widowed/divorced or separated (39.7%). Results shows that about 60.3%of the respondents had no formal education, followed by less than primary (27%), primary school completed (7%) and secondary school and above (4%). The wealth quintile was estimated by taking the assets possess by the respondents and categorized into five quintiles (namely poorest, poorer, middle, richer and richest). The caste category shows that about 57% belong to OBC followed by SC/ST (32%) and general (11%). The analysis of state of economic dependence shows that 46.5% were partially dependent and

about 11.3% were fully dependent. About 25.5% elderly were found to be living with their spouse/son/daughter and 12.3% living with spouse and unmarried son.

Table 3.5 Socio-economic and demographic characteristics of the elderly members

Covariates	%	N
Sex		
Male	49.4	153
Female	50.6	157
Age of the respondents		
60-65 Years	30.6	95
65-70 Years	35.5	110
70-75 Years	20.0	62
75 & Above	13.9	43
Marital Status		
Currently married	60.3	187
Widowed/Divorced or Separated	39.7	123
Education status of respondents		
No formal education	60.3	187
Less than primary	27.7	86
Primary school completed	7.4	23
Secondary school and above	4.5	14
Wealth quintile		
Poorest	19.7	61
Poorer	20.0	62
Middle	20.3	63
Richer	19.7	61
Richest	20.3	63
Caste		
General	11.0	34
Scheduled Caste/ Scheduled Tribe	31.9	99
Other Backward Caste	57.1	177
State of economic dependence		
Not dependent	42.3	131
Fully dependent	11.3	35
Partially dependent	46.5	144
Living arrangements		
Living alone	7.7	24
Living with spouse	25.5	79
Living with spouse and unmarried son/daughter	12.3	38
Living with spouse and married son	54.5	169
Place to sleep		
Separate room	65.0	201
Kitchen /Veranda	30.0	93
Others	5.0	16
N	100	**310**

3.3.2 Working status of elderly population

Table 3.6 shows the working status of the elderly respondents. About 38% elderly were not working followed by never worked for pay (42%), working as an agricultural laborer (6%) and engaged in farming (9%). About 20% of the population was still searching for job. The main reason for searching jobs at present was for income (9%) followed by helping their family (4%) and wants to be active (1.3%).

Table 3.6 Percentage of elderly population by working status

Working status	Percentage	N
Current Job		
Non-government Employee	1.3	4
Self employed	4.2	13
Farming	9	28
Agri-labourer	6.1	19
Not working for pay	41.6	129
Nor working	37.7	117
Main reason for not working		
Home maker	18.1	56
Doing unpaid work/Voluntary activities	3.2	10
Ill health	20.3	63
Retired or too old to work	37.7	117
Actively looking for work at present	20.3	63
Main reason for work at present		
Need the income	8.7	27
Want to be active	1.3	4
Help my family	4.2	13
Others	6.1	19

3.3.3 Economic dependency of elderly

Table 3.7 shows the state of economic dependency of elderly population. About 19% of the population was fully dependent on others out of which majority of them depended on their sons (55.5%).In countries like India, pension and social security are restricted to those elderly who have worked in the public sector or the organized sector of industry. Many surveys have shown that retired elderly people from informal sectors are forced to

work after sixty to meet their basic requirements or have to depend on others. This makes them more prone to health issues (Mahajan & Ray, 2013).

According to NSSO 60th round, the economic dependency among elderly was 75%, and these elderly were either supported by their children or grandchildren. However, due to limited financial resources, the children / grandchildren tend to neglect the health conditions of the elderly resulting in increased morbidity status. Also, this financial dependency at different circumstances creates conflict among mother-in-law/daughter-in-law resulting in abuse which is again responsible for other harmful health conditions (Ingle & Nath, 2008; Sing, 2015).

Table 3.7 Percentage of elderly by state of economic dependence

Status of economic independence	Percentage	N
State of economic dependence		
Not dependent	17.4	54
Fully dependent	18.7	58
Partially dependent	63.9	198
Depending on whom		
Spouse	15.8	49
Son	55.5	172
Daughter	9	28
Relatives	1.6	5
Others	0.6	2

3.3.4 Children staying with elderly

Number of children shows the kind of support elderly have in their twilight years, as in our society children are still regarded as the greatest support. Table 3.9 shows the mean number of children born in the sampled population. Mean number of male (1.84) children ever born was marginally higher than the female (1.69) children. Similar trend was also noticed in terms of living male and female child, as the total number of living male (1.72) child was marginally higher than those of female (1.53) child. More male (1.23) children were staying with their parents in comparison to female (0.33) children who usually leave their parent's houses after marriage.

Table 3.8 Mean number of children ever born/living and staying with the elderly

Status of children	Mean	N
Total number of children ever born		
Male	1.84	569
Female	1.69	524
Living male child	1.72	522
Living female child	1.53	476
Number of children staying with you		
Male	1.23	380
Female	0.33	103
Number of children staying away from you		
Male	0.54	167
Female	1.29	222

3.3.5 Transfer of assets by elderly

Table 3.9 shows the status of transfer of assets by the elderly. It was found that a large percentage of the elderly (75%) have transferred their assets. The primary recipient of the property were the children of elderly persons (77%) followed by the spouses (19%). The most commonly transferred asset was house (66%) followed by land (27%), saving (3.5%) and cash (3.5%).

Table 3.9 Transfer of assets by the elderly

Transfer of Assets	Percentage	N
Yes	74.8	232
Whom have you transferred your asset		
Spouse	19	45
Children/caregiver	77	178
Grand Children	3	6
Relative	1	3
What all have you transferred		
Cash	3.5	8
Saving	3.5	8
Plot	27	62
House	66	154

3.4 Summary

The summary of the above chapter highlights that the majority of the respondents belong to the Hindu community and are from Other Backward Caste (OBC) social group. More

than half of the population was found to be living in Kuccha houses which were owned by themselves. The housing condition shows that about one fourth of the population had a separate cooking space, rest were either cooking inside the living room or any other open space inside the house. The most commonly used cooking fuel was wood. In India, the main reason for using biomass as a fuel is poverty, inaccessibility to improved cooking fuel, and lack of awareness about harmful effects of biomass emissions (NSSO, 2012). Household Air Pollution (HAP) due to biomass fuel is regarded as the fourth important risk factor of global disease burden and the third leading risk factor for morbidity in India (Lim et al., 2012). The incomplete combustion of biomass results in large number of air pollutants such as carbon monoxide (CO), sulfur dioxide (SO2), metals like lead and copper which are responsible for various harmful diseases, such as Chronic Obstructive Pulmonary Disease (COPD) (Houtmeyers et al., 1999), Tuberculosis (TB) (Jindal et al., 2006), Cataract (Zodpey et al., 1999; Porhrel et al., 2005; Mishra et al., 1999) and adverse pregnancy outcomes such as stillbirths, low birth weight, intrauterine growth retardation, and infant mortality are the outcomes of the usage of biomass as a fuel (Lakshmi et al.,2013; Mishra et al., 2005; Tielsch et al., 2009).

The sanitation facilities depicts quite poor condition as more than 80% were found to be using open space for defecating and only 10% population used pits. More than half of the population had electricity connection and above 60% people were found using mobile phones. About 60% households were classified under BPL criteria and most of them are availing benefit of this card. Twenty percent of the elderly were fully dependent whereas others were meeting their economic needs from pension given by the government viz. Indira Gandhi National Old Age Pension Scheme (IGNOAPS). Seventy percent of the elderly had transferred their assets to their children and the most common transferred asset was house.

The finding suggests that, majority of the respondents belongs to the BPL category. As a higher proportion of the households are using bio-mass fuel as a mode for cooking, it has a negative impact on the overall health status of elderly population.

CHAPTER IV

SOCIO-ECONOMIC INEQUALITIES IN THE PREVALENCE OF MULTI-MORBIDITY AMONG THE ELDERLY

4.1 Introduction

The progression of ageing leads to loss of adaptive response towards stress and growing risk of age related diseases, resulting in progressive increase in age specific mortality. Most of the available studies on multi-morbidity in India are disease specific and fail to provide comprehensive overview of wide range of diseases occurring among rural elderly. Although the association between socio-economic status and prevalence of individual chronic diseases is well established, (Mielck et al., 2014; Marmot, 2005) few studies have examined the association between multi-morbidity and socio-economic status (Walker, 2007; Salisbury et al., 2011; Mercer and Watt, 2007). Moreover, better understanding of the epidemiology of multi-morbidity is necessary to develop interventions to prevent it and align health care services more closely to patients' needs. So, an intensive study on multi-morbidity among rural elderly is necessary to address the multiple deprivation of health to reduce the health burden among elderly. The objectives of this chapter are twofold; first, to assess the prevalence of various chronic conditions and morbidity among rural elderly in Bargarh district of Odisha and second, to examine the socio-economic and demographic factors that have a significant effect on the morbidity.

4.2 Variables under study

4.2.1 Dependent variables

In this chapter we have taken morbidity as our dependent variable. In order to determine the occurrence of morbidities, respondents were asked, "Has a doctor or nurse ever told you that you have any of the following ailments viz; Arthritis, Cerebral embolism, stroke or Thrombosis, Angina or heart disease, Diabetes, Chronic lung disease, Asthma, Depression, High blood pressure, Alzheimer's disease, Cancer, Dementia, Liver or gall bladder illness, Osteoporosis, Renal or Urinary tract infection, Cataract, Loss of all

natural teeth, Accidental injury (in past one year), Injury due to fall(in the past one year), Skin disease, and Paralysis?"

For descriptive analysis we have categorized the prevalence of morbidity into four groups: 1) elderly having no morbidity, 2) elderly having one morbidity, 3) elderly having two morbidities and4) elderly having three or more morbidity. Multi-morbidity is defined as those who are having 2 or more morbidities. For logistic regression, morbidity was recorded into binary form i.e. elderly having one or no morbidity was taken as '0' and one having 2 or more morbidity i.e. multi-morbidity was taken as '1'.

4.2.2 Independent variables

The various socio-economic and demographic factors are treated as independent variables namely a) Age (in five years age groups), b) Sex, c) Marital status, d) Education, e) Wealth quintile, f) Caste, g) State of economic dependence, h) Living arrangement, and i) life style indicators. The demographic variables which have been considered are – a) Sex divided into two categories (1. female 2. male), b) Age group (in five years group) divided into four categories (1. 60-65 years 2. 65-70 years 3. 70-75 years 4. 75+years).

The role of marital status has been clearly demonstrated in the literature examining the relationship between marital status and health outcomes (Kiecolt et al., 2001) All of the various unmarried states (being single, never married, being separated / divorced and being widowed) have been associated with elevated mortality risks(Manzoli et al., 2007). It has been proved that married people are better-off in health and suffer from less morbidity. For this study we have classified marital status into two categories viz., 1) currently married, 2 widowed/divorced or separated. Educational qualification is divided into four categories - 1. No formal education, 2. Primary school and less completed 3. Primary school completed 4. Secondary school and above completed.

The questionnaire also has questions related to 33 assets owned by households which were later converted into wealth quintile or wealth index. The wealth index is based on household assets and housing characteristics, such as (mattress, pressure cooker, chair, bed, table, electric fan, radio, black and white television, color television, sewing machine, mobile phone, any other phone, computer, refrigerator, watch, bicycle,

motorcycle, animal drawn cart, car, water pump, thresher, tractor and electricity). Using principal component analysis these assets and their characteristics were combined into a single variable. After ranking this variable from low to high, households were divided into five equal-sized groups namely - 1) Poorest (Q1) 2) Poorer (Q2) 3) Middle (Q3) 4) Richer (Q4) 5) Richest (Q5). Caste is divided based on caste schedule followed as per Government of India guidelines - 1. Scheduled Caste / Scheduled Tribe 2. Other Backward Caste 3.General. The state of economic dependence is divided into three categories 1. not depending on others, 2. partially dependent and 3.fully dependent.

Living arrangements refers to the type of family in which the elderly live, the headship they enjoy, the place they stay in & the people they stay with, the kind of relationship they maintain with their kith and kin, and the extent to which they adjust to the changing environment (Palloni, 2002; Rajan et al., 1995). While dealing with the welfare of any specific group, it is important to study their pattern of living arrangement. There exists several living patterns for the elderly such as - living with the spouse, living with children, living with other relations and non-relations and living alone (as an inmate of old age homes). In this study living arrangement is categorized into four categories i.e. 1) living alone, 2) living with spouse/son/daughter, 3) living with spouse and unmarried sons, 4) living with spouse and married son.

A report by US National Cancer Institute in 2002 reveals that the Asian people have been using tobacco in various forms since ages (Roland, 2002).Moreover, the International Agency for Research on Cancer in 2007 (Lyon, 2007) strongly expresses that SLT (smokeless tobacco) is common in Asian countries such as India, Pakistan and Bangladesh. The use of SLT varies by age, sex, ethnicity and socioeconomic status, both within and among countries (Bogner et al., 2005). A study concluded that use of tobacco as well as SLT leads to chronic heart diseases (Accortt.et al., 2002). In this study, we have considered a set of variables as risk behaviors like i) Smoking (1. Yes 2. No), ii) Consumption of alcohol (1. Yes 2. No), iii) Chewing tobacco (1. Yes 2. No).

4.2.3 Statistical analysis

At first, we have performed a descriptive analysis to assess the socio-economic differentials in the prevalence of multi-morbidity. Secondly, binary logistic regressions

were carried out to explore factors responsible for the prevalence of multi-morbidity among rural elderly in Odisha.

Logistic regression can be used to predict a dependent variable on the basis of independents and to determine the per cent of variance in the dependent variable explained by the independents; to rank the relative importance of independents; to assess interaction effects; and to understand the impact of covariates. Logistic regression applies maximum likelihood estimation after transforming the dependent into a logit variable (the natural log of the odds of the dependent occurring or not). So, logistic regression estimates the probability of certain event whether occurring or not.

Table 4.1 Model design for logistic regression analysis

Models	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Variables	**Only demographic variables**	**Only Socio-economic variables**	**Only life style indicators**	**All independent covariates**
	• Age • Sex • Marital status	• Education • Wealth Index • Caste • State of economic dependence • Living arrangements	• Smoking • Consuming tobacco	• Age • Sex • Marital status • Education • Wealth Index • State of economic dependence • Living arrangements • Smoking • Consuming tobacco

4.3 Results

4.3.1 Socio-economic and demographic profiles of respondents

Table 4.2 presents the sample characteristics of the studied population by selected socio-economic covariates. Out of the total sample of 310 respondents, 153 are male and 157 are female.

Table 4.2 Percent distribution of respondents by selected socio-economic characteristics

Covariates	%	N
Sex		
Male	49.4	153
Female	50.6	157
Age of the respondents		
60-65 Years	30.6	95
65-70 Years	35.5	110
70-75 Years	20	62
75 & Above	13.9	43
Marital Status		
Currently married	60.3	187
Widowed/Divorced or Separated	39.7	123
Education status of respondents		
No formal education	60.3	187
Less than primary	27.7	86
Primary school completed	7.4	23
Secondary school and above	4.5	14
Wealth quintile		
Poorest	19.7	61
Poorer	19.4	60
Middle	21	65
Richer	19.7	61
Richest	20.3	63
Caste		
General	11	34
Scheduled Caste/ Scheduled Tribe	31.9	99
Other Backward Caste	57.1	177
State of economic dependence		
Not dependent	42.3	131
Fully dependent	11.3	35
Partially dependent	46.5	144
Living arrangements		
Living alone	7.7	24
Living with spouse/Son/ Daughter	25.5	79
Living with Spouse and unmarried son	12.3	38
Living with Spouse and married son	54.5	169
BPL card holder		
Has the card	58.1	180
Risk Behaviors		
Smoking (Yes)	31	96
Consuming Alcohol (Yes)	4.19	13
Consuming Tobacco (Yes)	63.2	196
N		**310**

The married people comprise of 60.3% and widowed/divorced or separated comprise of 39.7% of the total sample. Study on Literacy or Education of the respondents' shows that about 60.3% have no formal education, followed by 27.7% who have completed primary education or less and only 4.5% have completed their secondary school and above. In State of Economic Dependence, about 46.5% are partially dependent, followed by not dependent on others and 11.3% are fully dependent on their spouse, son or other relative.

While analyzing Caste structure, Other Backward Caste has the highest share of 57.1%, followed by Scheduled Caste/ Scheduled Tribe with 31.9% and General have 11% only. Elderly living with spouse and married son are the most with about 54.5%, followed by living with either spouse/son or daughter and elderly living alone are the least with only 7.7% share. About 58.1% of the population have Below Poverty Line card. About 63 % of the respondents are consuming tobacco, out of which 35% were males and 28% were females. 31 % of them are used to smoking and a small proportion (4%) in drinking alcohol in which the female proportion was almost nil.

4.3.2 Prevalence of morbidity by gender

Table 4.3 presents percentage of respondents having selected morbidities by gender. The individuals were asked whether the doctor had ever told them that they might be having any of the above mentioned chronic diseases. To verify the responses, the test results / doctor's prescriptions / supporting documents were checked during the interview session. This table clearly shows that the most common disease in this rural setup is Arthritis with total 52.9% and it is slightly higher for females with 54.7% of the total sample. A high prevalence of arthritis / joint pain in the current study especially among females was also reported in other studies (Khokhar & Mehra, 2001), thus reflecting the hard life faced by women who never retire from household work unless totally disabled.

Next prevailing disease followed by Arthritis, with about 20% of the elderly reported was Chronic Obstructive Pulmonary Disease (COPD), with males having a higher share of 30% in comparison to females having just 10.1%.

The third prevalent morbidity is High blood pressure or hypertension. The result shows that about 19.35% of respondents are suffering from Hypertension. Cataract is also one of

the important morbidities present in the rural population of our sample, it accounted for about 18.70%. It is more common in females compared to their male counterparts. Skin diseases, paralysis and accidental injury are also the other forms of morbidities occurring among rural elderly in Odisha.

Table 4.3 Percent of respondents having selected morbidities by gender

Morbidities	Male (N=153)	Female (N=157)	Total (310)
Arthritis	50.9	54.7	52.9
Cerebral-embolism, stroke or Thrombosis	0.6	1.9	1.2
Heart disease	0.6	4.4	2.5
Diabetes	7.8	10.8	9.3
Chronic obstructive pulmonary disease	30.0	10.1	20.0
Asthma	9.1	10.1	9.6
Depression	7.1	4.4	5.8
High blood pressure	26.1	12.7	19.3
Alzheimer's disease	3.9	9.5	6.6
Cancer	0.0	1.9	0.9
Dementia	4.5	7.6	6.1
Liver or gall bladder illness	4.5	3.1	3.8
Osteoporosis	1.9	3.1	2.5
Renal or Urinary tract infection	9.1	3.8	6.4
Cataract	21.5	15.9	18.7
Loss of all natural teeth's	4.5	7.0	5.8
Accidental injury (in past one year)	11.7	6.3	9.0
Injury due to fall(in past one year)	3.9	2.5	3.2
Skin disease	6.5	7.0	6.6
Paralysis	8.4	4.4	6.4

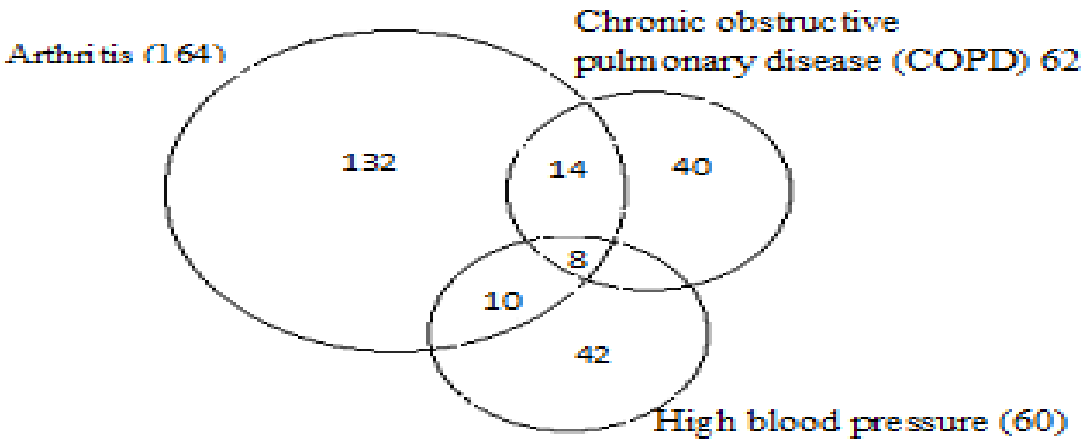
While comparing the prevalence of disease amongst males and females, it shows that arthritis is more common among females than males, whereas chronic lung disease and high blood pressure are more common among males. Similarly, dementia and Alzheimer's disease are more common among females and cataract amongst males. For other diseases, both male and females shared similar patterns with few variations.

4.4 Pattern of multi-morbidity

The following Venn diagram figure 4.1 shows the overlapping of major morbidities found among rural elderly in Odisha. The three common morbidities are arthritis (164), chronic obstructive pulmonary disease (62) and high blood pressure (60). Amongst 164 elderly people having arthritis about 22 (13.4%) are suffering from chronic obstructive

pulmonary diseases, 18 (11%) are having high blood pressure and (8) 5% are having all the three morbidities.

Figure 4.1 Venn diagram displaying the Overlapping of multi-morbidity patterns in numbers related to the total population



Hence, the result shows that the occurrence of multi-morbidities is very common among our study population.

4.5 Prevalence of multi-morbidity by age groups

Table 4.4 shows the relationship between age groups (60-65 years, 65-70 years, 70-75 years and 75+ years) and the intensity of morbidities. The occurrence of morbidities is classified into four groups - i) no morbidity, ii) having one morbidity, iii) having 2 morbidities and iv) having 3 or more morbidities. Multi-morbidity is defined as persons having two or more morbidities. Results from table 4 clearly suggest that, the rate of multi-morbidity increases with the increased age. The rate of multi-morbidity is 74% among 75+ year elderly compared to 40% for 60-65 years age group elderly. Another interesting finding of this study revealed that about 95%of the elderly (in the age group of 75+ years) have at least one morbidity.

Table 4.4Prevalence of morbidity by age groups

Number of morbidities	% of respondents by morbidity profile (Age group)									
	60-65 Years		65-70 years		70-75 years		75+years		Total	
	%	N	%	N	%	N	%	N	%	N
No morbidity	16.8	16	9.1	10	6.5	4	4.7	2	10.3	32
One morbidity	43.2	41	33.6	37	24.2	15	20.9	9	32.9	102
Two morbidity	17.9	17	28.2	31	35.5	22	30.2	13	26.8	83
Three or more	22.1	21	29.1	32	33.9	21	44.2	19	30.0	93
At least two morbidities	40.0	38	57.3	63	69.4	43	74.4	32	56.8	176
N		**95**		**110**		**62**		**43**		**310**

4.6 Socio-economic differentials in multi-morbidity

As reviewed in earlier section, the rate of multi-morbidity varies with selected socio-economic and demographic covariates. Results from table 4.5 shows that the overall prevalence of multi-morbidity was 56.8% among rural elderly in Odisha. Unlike earlier studies the rate of multi-morbidities was higher for male compared to their female counterpart. This could be partly due to the response bias, as male are more open to disclose their disease experience compared to their female counterparts.

The relationship between economic status (measured in terms of wealth index) and occurrence of multi-morbidity is very weak. The prevalence of multi-morbidities by categories of educational status is identical, revealing the fact that occurrence of diseases are independent of education. Elderly belonging to Other Backward Caste (61%) are more prone to multi-morbidity compared to General Caste (58.8%) and Scheduled Caste / Scheduled Tribe (48.5%) elderly. State of economic independence is strongly associated with the rate of multi-morbidity. The multi-morbidity prevalence is about 71.4% for elderly who are fully dependent on others compared to elderly who are not dependent on others (48.1%). The disease prevalence is lower among elderly those who stay with their spouse and unmarried son (42.1%) compared to their counterparts. As established in other studies, in this study too, life style indicators are positively associated with the occurrence of multi-morbidity.

Table 4.5 Multi-morbidity prevalence by selected socio-economic and demographic covariates

Covariates	%	N
Sex		
Female	50.3	157
Male	63.4	153
Age of the respondents		
60-65 Years	40.0	95
65-70 Years	57.3	110
70-75 Years	69.4	62
75 Years & Above	74.4	43
Marital Status		
Currently married	57.8	187
Widowed/Divorced or Separated	55.3	123
Education status of respondents		
No formal education	56.7	187
Less than primary	57.0	86
Primary school completed	56.5	23
Secondary school and above	57.1	14
Wealth quintile		
Poorest	60.7	61
Poorer	53.3	60
Middle	52.3	65
Richer	63.9	61
Richest	54.0	63
Caste		
General	58.8	34
Scheduled Caste/ Scheduled Tribe	48.5	99
Other Backward Caste	61.0	177
State of economic dependence		
Not dependent	48.1	131
Fully dependent	71.4	35
Partially dependent	61.1	144
Living arrangements		
Living alone	54.2	24
Living with spouse/Son/ Daughter	59.5	79
Living with Spouse and unmarried son	42.1	38
Living with Spouse and married son	59.2	169
BPL card holder		
Yes	58.1	180
No	41.9	130
Smoking		
Yes	60.4	96
No	55.1	214
Consuming Tobacco		
Yes	60.7	196
No	50.0	114
N	**56.8**	**310**

4.7 Multivariate logistic regression analysis

In view of the fact that, several of demographic, socio-economic and life style factors are interrelated, multivariate regression models of multi-morbidity are estimated to assess the independent effects of these factors on the occurrence of multi-morbidity, controlling for other predictors in the model. Table 4.6 presents the results of logistic regression analysis taking four models into consideration.

Results from Model 1 indicate that among demographic variables, age has a very large effect on the occurrence of multi-morbidity. The prevalence of multi-morbidity increases steadily with age. The Odds Ratio (OR) of multi-morbidity prevalence is about 4.27 (CI:1.87-9.73) times higher for elderly above 75 years compared to those in 60-65 years age group.

Model 2 assesses the cumulative impact of various socio-economic covariates on multi-morbidity. Results from the analysis shows that among socio-economic variables, only the state of economic independence has significant impact on multi-morbidity. The prevalence of multi-morbidity is significantly higher for the elderly who are dependent on others compared to their counterparts.

Life style indicators (smoking and chewing tobacco) have a significant effect on the occurrence of multi-morbidity (Model 3). The elderly consuming tobacco are 1.72 times more prone to morbidity than those who do not consume tobacco at all. Similarly, elderly who smoke regularly are about 1.46 times more prone to morbidity than those who do not smoke.

Finally, in Model 4 all variables are included to assess the adjusted effect of various demographic and socio-economic covariates on multi-morbidity.

Even after controlling all the covariates- like age, state of economic independence, and the life style indicators have retained their significant effect on the occurrence of multi-morbidity.

Table 4.6 Results of logistic regression analysis of factors associated with multi-morbidity

Variables	Model 1	Model 2	Model 3	Model 4
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sex				
Female®	1.00			1.00
Male	1.39 (0.85-2.29)			1.68 (0.91-3.11)
Age				
60-65 years®	1.00			1.00
65-70 years	2.04* (1.16-3.58)			2.33* (1.22-4.45)
70-75 years	3.43** (1.69-6.94)			4.91** (2.18-11.05)
75+years	4.27** (1.87-9.73)			4.65**(1.87-11.52)
Marital status				
Currently married®	1.00			1.00
Widowed/ Divorced or Separated	0.79 (0.47-0.133)			0.92 (0.47-1.78)
Wealth Index				
Poorest®		1.00		1.00
Poorer		0.93(0.43-2.02)		1.22(0.52-2.84)
Middle		0.64 (0.28-1.47)		0.70 (0.28-1.72)
Richer		1.08 (0.47-2.46)		1.41 (0.57-3.48)
Richest		0.59 (0.24-1.43)		0.60 (0.23-1.54)
Education				
No formal education®		1.00		1.00
Less than primary		1.22 (0.68-2.20)		1.38 (0.69-2.75)
Primary school completed		0.94 (0.37-2.39)		1.62 (0.54-4.89)
Secondary school and above		1.68 (0.49-5.75)		2.36 (0.54-10.35)
Caste				
General®		1.00		1.00
Scheduled Caste/ Scheduled Tribe		0.60 (0.25-1.42)		0.58 (0.22-1.54)
Other Backward Caste		1.02 (0.45-2.32)		0.891 (0.35-2.21)
State of Economic independence				
Not depending®		1.00		1.00
Fully dependent		3.06* (1.29-7.24)		5.21** (1.99-13.60)
Partially dependent		2.05** (1.20-3.50)		3.02** (1.57-5.81)
Living arrangement				
Living alone®		1.00		1.00
Living with spouse or son or		1.44 (0.53-3.93)		1.35 (0.41-4.46)
Living with Spouse and unmarried		0.64 (0.20-2.00)		0.40 (0.10-1.56)
Living with Spouse and married		1.55 (0.57-4.20)		1.25 (0.40-3.86)
Smoking				
No®			1.00	1.00
Yes			1.46* (0.87-2.46)	1.85* (0.98-3.50)
Chewing Tobacco				
No®			1.00	1.00
Yes			1.72** (1.05-2.81)	2.82** (1.51-5.24)
Total				
Constant	-.481	-.183	-.185	-2.212

**significant at 5 per cent level; ** significant at 1 percent level; ® Reference group*

4.8 Discussion and conclusions

Given the increasing prevalence of multi-morbidity, understanding the socio-economic differentials in multi-morbidity is important in formulating national and sub-national policies by the health planners to address the issues in a broader perspective. The overall prevalence of multi-morbidity was 57% among rural elderly in Bargarh District of Odisha this fits well with the reporting range of multi-morbidity rates reported in other studies in India (Guralnik, 1996, Purty et al., 2006; Charlson et al., 1987; Rana et al., 2009).Also studies from other countries suggest that the prevalence of multimorbidity was 53.8% in Bangladesh (Khanam et al., 2011), 55% in Swedish elderly (Marengoni, el al., 2008), 75% Australia (Britt, et al., 2008) and 65% in North America (Guralnik, 1996), although the criteria or definition were not identical in those studies. Our result shows that the most common diseases in rural set-up are- Arthritis, COPD, High Blood Pressure and Cataract. Globally, COPD is expected to rise to the 3rd position as a cause of death and at the 5th position as the cause of loss of disability adjusted life years (DALYs), according to the baseline projections made in the Global Burden of Disease Study (GBDS) by 2020 (Murray & Lopez, 1997).Tobacco smoking remains the most important risk factor identified as the cause of COPD and chronic respiratory morbidity (Jindal et al., 2006; Maranetra , 2002). Tobacco related mortality is estimated to be highest in India, China and other Asian countries (Angra, 1997). Studies from Karnataka and Kolkata have also reported that the prevalence of hypertension was about 30.5% and 40.5% respectively (By Y et al., 2010; Chinnakali et al., 2012). The difference in prevalence levels may be due to different geographical factors and may be due to differences in dietary pattern.

About one-fifth of the elderly were suffering from Cataract in Bargarh district of Odisha. The prevalence of Cataract may be higher due to increased exposure to ultraviolet radiation during long hours of work in open fields (Angra et al., 1997).

Results from the multivariate analysis show that age, state of economic independence and life style indicators are the most important measured predictors of multi-morbidity. Unlike earlier studies, wealth index and education have a marginal impact on multi-morbidity rate. Moreover, the occurrence of multi-morbidity is higher for male elderly compared to female counterparts though the difference is not significant. Several recent studies revealed that the gender differences in multi-morbidity prevalence are marginal

(Akker et al., 1996). There was a positive association between age and prevalence of multi-morbidity. Literature also suggest similar relationship between age and multi-morbidity(Akker, Buntinx & Knottnerus, 1996; Britt et al., 2008; Guralnik, 1996).

The findings of the study suggest that any effort to re-organize primary care for the elderly people should also consider the high prevalence of multi-morbidity among rural elderly in India. Since multi-morbidity may cause significant cognitive and functional consequences researcher and policy makers should work together to develop effective intervention strategies and programs to reduce the burden of multi-morbidity. Moreover, new health care model should be developed to meet the health care needs of elderly people with multi-morbidity in India.

CHAPTER V

RELATIONSHIP BETWEEN MORBIDITY, DISABILITY AND PSYCHOLOGICAL DISTRESS

5.1 Introduction

Multi-morbidity is associated with adverse health outcomes such as reduced physical functions (Kadam & Croft, 2007), reduced LS which causes psychological distress(Fortin et al., 2004; Shivakumar et al., 2015). Chronic diseases are common in old age such as Arthritis Cardiovascular and Diabetes and they are associated with disability in the long run (Fried et al., 1999). This has a significant impact on the quality of life among elderly.

The growing number of elderly raises issues in ensuring healthy ageing. While morbidity among the elderly influences negatively their Quality of Life (QoL), psychological distress further compounds the issues of disability and morbidity (Shivkumar et al., 2015). Vision problem, Arthritis, Hypertension and Diabetes were the major morbidities responsible for disability and lower level of LS among elderly (Lokare et al., 2011).A study in rural Aurangabad, India concluded that Cataract, Joint pain, COPD, Hearing Impairment, Hypertension, Diabetes Mellitus and Anemia were most common morbidity in the rural elderly and they were the main reason for impairments and disability (Jadhav et al., 2012).

The previous chapter deals with socio economic inequalities in the prevalence of multi-morbidity among rural elderly in Bargarh district of Odisha. This chapter explores the interrelationship between morbidity, disability and psychological distress among the rural elderly in Odisha. In India, burden of both communicable and non-communicable diseases are higher among the elderly population. This is further aggravated by impairment of sensory functions like vision and hearing. Age related physiological changes in the elderly make them more vulnerable to chronic diseases, disabling them and resulting into multiple health problems. Understanding the specific chronic condition causing disability and psychological distress may help to reduce the disablement process to some extent.

5.2 Models of disability

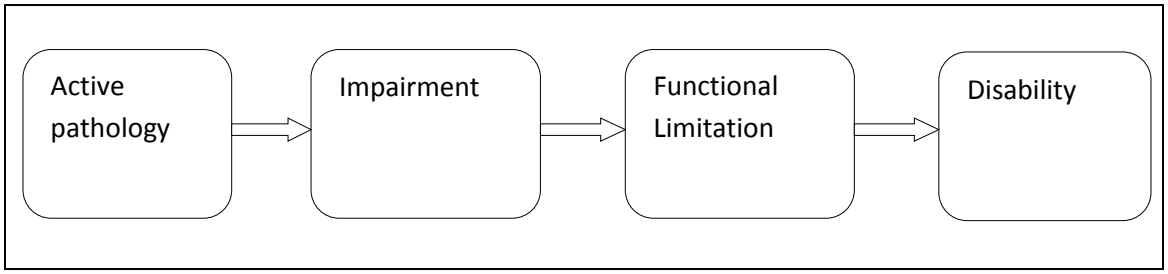
Morbidity, disability and psychological well-being are multidimensional concepts. In common language, disability most probably refers to the lack of a bodily part or function. The definition of disability varies according to the different model used in several contexts.

5.2.1 The Disablement model of disability

The Disablement Model was developed in the early 1960's by sociologist Saad Nagi. The four elements of Nagi's Disablement Model:

- **Active pathology**: This explains how any interruption in normal body processes leads to a deviation from the normal state. These include infection, trauma, disease processes, or other degenerative conditions.
- **Impairment**: Means a complete loss or interruption in normal body structures or systems. Interestingly, this model describes how active pathologies commonly result in impairments, but the reverse is not always true. For example, impairment, such as a congenital limb absence, is not the result of active pathology.
- **Functional Limitations**: Are described as individual performance restrictions. Here, a muscular contraction could cause a functional limitation such as limited range-of-motion in the upper limb.
- **Disability**: Is described as an expression of physical and/or mental limitation is the context of a society.

Figure 5.1 Disablement model of disability by Saad Nagi (1960)

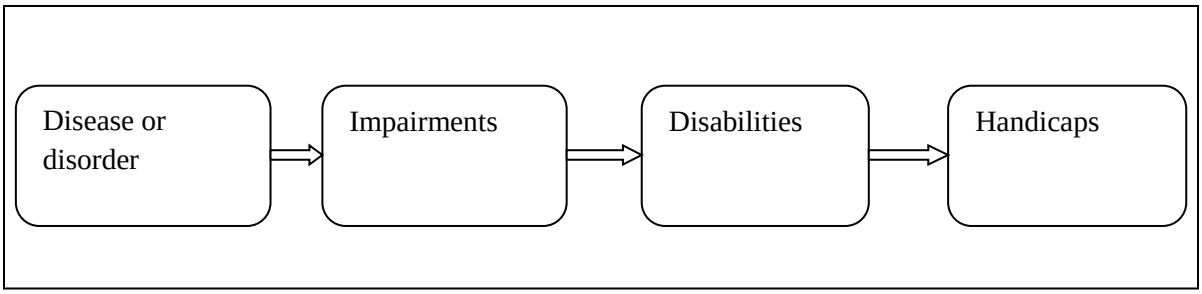


The disablement model views disability as an interaction between the individual and society.

5.2.2 The World Health Organization (WHO) model of disability

The second model from complementary frame work is WHO model known as the International Classification of Impairments, Disabilities, and Handicaps (ICIDH) it is a part of the ICD-10 (International Classification of Diseases).

Figure 5.2 ICIDH Model of Disability (1980)



The ICIDH identified three fundamental concepts i.e. impairments, disabilities and handicaps that were recommended to describe disability. The basic elements of the ICIDH Model of Disability was impartment it meant any abnormality of bodily functions (including mental functions). Disability was defined as a limitation in activity that ended in impartment. Finally handicap was the disadvantage in social context brought by disability (Figure 5.2). In 2001, WHO has revised the ICIDH framework and named it as International Classification of Function and Disability (ICF). This framework describes changes to health as the dynamic interaction between the health conditions and contextual factors.

5.3 Methodology

5.3.1 Variables under study

In order to determine the occurrence of morbidities, which has already been discussed in previous chapter respondents were asked, ‘‘*Has a doctor or nurse ever told you that you have any of the following ailments such as Arthritis, Cerebral embolism, Stroke or Thrombosis, Angina or Heart disease, Diabetes, COPD, Asthma, Depression, high Blood Pressure, Alzheimer’s disease, Cancer, Dementia, Liver or Gallbladder illness, Osteoporosis, Renal or Urinary tract infection, Cataract, Loss of all natural teeth, Accidental injury (in past one year), Injury due to fall (in past one year), Skin disease,*

and Paralysis?'' All morbidities are addressed as in International classification of diseases (ICD 10). The International Classification of Diseases is the standard diagnostic tool for epidemiology, health management and clinical purposes. This includes the analysis of the general health situation of population groups. It is used to monitor the incidence and prevalence of diseases and other health problems, proving a picture of the general health of populations (WHO 2011).

Psychological distress was evaluated by using General Health Questionnaire (GHQ-12) which is one of the most commonly employed measures of mental health. The GHQ covers current symptoms of distress and demoralization and is designed to identify individuals at high risk of having a diagnosable emotional disorder. The questions like "*have you been able to concentrate on whatever you are doing?"* and others related to mental health has been asked. The responses were recorded in dichotomous format (*yes/no*). The questions are framed both positively and negatively. Out of total twelve questions seven questions are positively framed and five negatively framed, for each positive question if the respondent marks "yes" it was counted as 1 or else 0 and for every negative question if the respondent marked "yes" it was counted as 0 and if he/she marked no it was taken as 1. The score ranged from 0 to12). Due to the various thresholds of the GHQ-12, the mean GHQ score for a population of respondents was suggested as a rough indicator for the best cut-off point (Goldberg, Oldehinkel & Ormel, 1998). Therefore, based on the mean GHQ score for this sample, the cut-off point 4 was used to determine the respondents' level of psychological well-being. Elderly who scored above 4 score were having good mental health and those below 4were having bad mental health (Lesage et al., 2011; Marowska et al., 2002; Cano et al., 2001; Zulrefly et al., 2010).

In this chapter we have considered three types of disabilities such as physical, ADL & IADL. Physical disability was evaluated by asking question like, "*Do you have any difficulty with any of the following?* (Vision, Hearing, Walking, Chewing, Speaking, and Memory). The most appropriate method or tool to assess ADL of the elderly is the Katz Index of independence in ADL, commonly referred to as the Katz ADL. Dichotomous responses were recorded (yes/no) for independence in each of the six functions namely, bathing, dressing, toilet, mobility, continence and feeding. A score ranges between 0-6.

The mean score of Katz index was 3.5. So, we have considered 3.5 as a cut off value. The IADL was measured by using a scale developed by Lawton and Brody, which measures competence in skills such as shopping, cooking, and managing finances, is required for independent living. The Lawton IADL scale can be scored in several ways, depending on the goal of the assessment and how the information will be used. The most common method is to rate each item dichotomously (0 or 1). The score ranged from 0 to 8. We settled on 3 as a cut off value and defined those elderly who scored above 3 as having good IADL functions and those below 3 were having bad IADL functioning (Gallo& Paveza, 2006).A study conducted in Delhi examined the physical and mental status among elderly (aged 60 years and above) using the katz ADL scale as well as the GHQ - 12. Results showed that the mental and physical health of the elderly was directly proportional to their morbidity status (Dhuria et al., 2014). Another study conducted in north India among elderly residing in the hills of Shimla used ktaz ADL scale and Lawton's IADL scale to measure the disability status of elderly. Results suggest that both ADL and IADL activities among elderly is significantly associated with their cognitive functioning (Sharma et al., 2014).Description of variables used in this chapter is given in table 5.1.

Table 5.1 Description of variables used in the study

Predictive variables	**Parameters**	**Instruments**
Morbidity	No Morbidity One morbidity Two morbidities Three or more morbidities	International Classification of Diseases (ICD)-10
Disability		
Physical disability	Vision, hearing, walking, chewing, speech, memory.	Questionnaire containing dichotomous responses (*Yes/No*)
Activities of Daly Living (ADL)	Feeding, continence, transferring, toileting, dressing, bathing.	Katz scale
Instrumental Activities of Daly Living (IADL)	Using the telephone, shopping, preparing food, housekeeping, doing laundry, using transportation, handling medication, handling finances.	Lawton scale
Psychological distress	12 questions related with psychological well-being among elderly	General Health Questionnaire (GHQ)-12

5.3.2 Statistical analysis

Chi-squire was estimated to assess the bivariate association between various types of morbidities with disability and psychological distress. Second, logistic regression analysis was employed to examine the adjusted effect on number of morbidities on disability and psychological distress. The dependent variables were dichotomous in nature and defined as: *Physical disability* (having any disability=1; Otherwise=0); *ADL disability* (ADL score less than 3.5=1; Otherwise=0); *IADL disability* (IADL score less than 3=1; Otherwise=0); *Psychological distress* (GHQ score less than 4=1; Otherwise=0).

5.4 Results

5.4.1 Disability and morbidity status of the elderly by gender

Table 5.2 presents the morbidity, disability, psychological well-being, ADL and IADL status of the respondents. The prevalence of disability was higher for male (76.5%) as compared to female elderly (65.0%). Result reveals that the overall prevalence of disability (71%) was quite high among the rural elderly in Odisha.

Table 5.2 Disability& morbidity status of the elderly by gender

Characteristics	Male (N=153)		Female (N=157)		Total (N=310)	
	%	N	%	N	%	N
Physical						
Not Disabled	23.5	36	35.0	55	29.4	91
Disabled	76.5	117	65.0	102	70.6	219
Psychological						
Not Distress	59.5	91	41.4	65	50.3	156
Distress	40.5	62	58.6	92	49.7	154
ADL						
Functional	74.5	114	79.0	124	76.8	238
Not functional	25.5	39	21.0	33	23.2	72
IADL						
Good	47.1	72	35.0	55	41.0	127
Bad	52.9	81	65.0	102	59.0	183
Morbidity						
No Morbidity	10.5	16	10.2	16	10.3	32
One morbidity	26.1	40	39.5	62	32.9	102
Two	30.1	46	23.6	37	26.8	83
Three or more	33.3	51	26.8	42	30.0	93

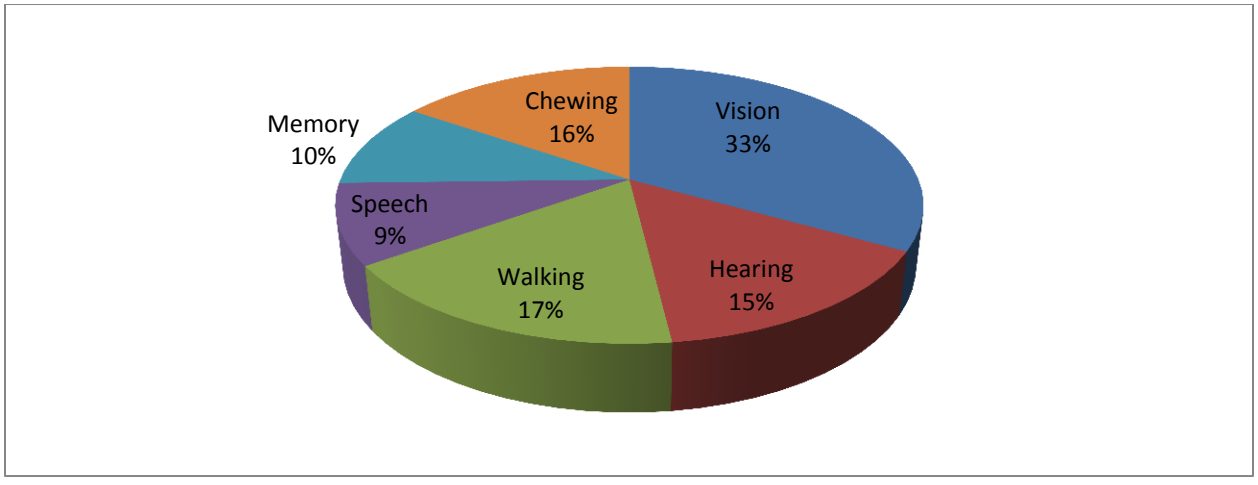
***** *Activities of daily living status***Instrumental Activities of Daily Living*

The psychological distress was more among females (58.6%) than males. About half of the elderly were psychologically distressed in the study area. In terms of ADL disability, male (25.5%) suffers more than female (21.0%). The functionality status measured in terms of ADL score revealed that about one-fourth of the elderly were non-functional (ADL score below 3.5). The status of non-functionality was higher for male compared to their female counterparts. However, the scenario was reverse in case of IADL disability, where female (65.0%) suffers more than male (52.9%). As more than half (60%) of the elderly had difficulty in their IADL activities, which is an alarming issue as it is an initial stage of disability. Results suggest that the prevalence of morbidity was higher for males compared to females. This could be due to reporting bias, as males are more open to report their ailments.

5.4.2 Type of physical disability

Visual disability was the most common disability in the area followed by walking (17%), chewing (16%) and hearing disability (15%). Memory and speech disability were the least prevalent disabilities (Figure 5.3).

Figure 5.3 Type of physical disability



5.4.3 Disability and psychological distress by age and gender

Table 5.3 shows the status of physical disability by age and gender. Results show that prevalence of disability increases with age among the elderly population. Most common physical disability are: Visual and loco motor (mobility).

Table 5.3 Physical disability status by age and gender

	Male			Females		
Age → **Physical disability**	**60-65**	**65-70**	**70 and above**	**60-65**	**65-70**	**70 and above**
Vision	25.6	74.5	87.9	25.5	56.5	84.6
Hearing	5.1	26.1	50.0	12.7	25.8	35.9
Walking	30.8	29.8	56.1	16.4	21.0	28.2
Chewing	2.6	19.1	53.0	14.5	27.4	41.0
Speech	5.1	17.0	27.3	9.1	17.7	20.5
Memory	2.6	17.0	31.8	10	11.3	30.8

Table 5.4 shows the status of ADL disability, IADL disability and psychological distress by age and gender. Results suggest that ADL disability, IADL disability and psychological distress increases with age.

Table 5.4 Functional Disability (IADL, ADL) and psychological distress status by age and gender

	Male			Females			Total		
Age Groups →	**60-65**	**65-70**	**70+**	**60-65**	**65-70**	**70+**	**60-65**	**65-70**	**70+**
ADL (require assistance)	7.5	19.1	40.9	5.5	31.7	25.6	6.3	26.4	35.2
IADL(having problem)	37.5	38.3	72.7	50.9	65.1	84.6	45.3	53.6	77.1
Psychological Distress	35	44.7	40.9	56.4	63.5	53.8	47.4	55.5	45.7

5.4.4 Association between morbidity, disability and psychological distress

Table 5.5 presents the medical conditions that were significantly related with physical disability, IADL and ADL and psychological distress. The medical conditions that were significantly associated with disability (physical, IADL and ADL) were: COPD, Diabetes, Paralysis, Hypertension, Alzheimer's, Cataract, Accidental injury.

The chronic conditions which were significantly associated with psychological distress were: Arthritis, COPD, Asthma, Cataract, Accidental injury, Injury due to fall, and Paralysis.

Table 5.5 Relationship of morbidity with disability and psychological distress

Morbidity status	Physical disability		IADL disability		ADL disability		Psychological distress	
Type of morbidity	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**
Arthritis								
Yes (n=164)	71.3	117	56.7	93	26.0	43	57.3*	94
No (n=146)	69.9	102	61.6	90	20.0	29	41.1	60
Diabetes								
Yes (n=29)	79.3*	23	65.5*	19	55.2**	16	58.6	17
No (n=281)	69.8	196	58.4	164	19.9	56	48.8	137
Chronic lung disease(COPD)								
Yes (n=62)	83.9**	52	64.5*	40	35.5*	22	52.4**	32
No (n=248)	67.3	167	57.7	143	20.2	50	48.7	121
Asthma								
Yes (n=30)	80.0	24	30.0	9	24.2	7	53.6*	16
No (n=280)	69.6	195	62.1	174	23.2	65	13.3	138
Hypertension								
Yes (n=60)	85.0**	51	88.3*	53	55.0*	33	58.3	35
No (n=250)	67.2	168	52.0	130	15.6	39	47.6	119
Alzheimer's Disease								
Yes (n=21)	69.2*	15	71.4*	15	33.3*	7	66.7	14
No (n=289)	70.5	204	58.1	168	22.5	65	48.4	140
Cataract								
Yes (n=58)	91.4*	53	69.0**	40	27.6*	16	67.2*	39
No (n=252)	65.9	166	56.7	143	22.3	56	45.6	115
Loss of Natural teeth								
Yes (n=18)	94.4	17	83.3	15	38.9	7	72.2	13
No (n=292)	69.2	202	57.5	168	22.3	65	48.3	141
Accidental Injury								
Yes (n=28)	96.4*	27	17.9*	5	24.8*	7	52.1*	15
No (n=282)	68.1	192	63.1	178	23.1	65	49.3	139
Injury due to fall								
Yes (n=10)	60.0	6	40.0	4	40.0	4	n.c.	n.c
No (n=300)	71.0	213	59.7	179	22.7	68	n.c.	n.c
Skin Disease								
Yes (n=21)	95.2	20	66.7	14	21.5	5	50.5	11
No (n=289)	68.9	199	58.5	169	23.2	67	49.6	143
Paralysis								
Yes (n=20)	86.6**	17	89.0**	18	85.0*	17	85.0**	17
No (n=290)	69.5	202	56.9	165	19.0	55	47.2	137
Total (N=310)	**70.6**	**219**	**59.0**	**183**	**23.2**	**72**	**49.7**	**154**

**significant at 5 per cent level; ** significant at 1 percent level; n.c. Not calculated*

5.4.5 Logistic regression analysis relating medical conditions to disability & psychological distress

Logistic regression analysis was employed to assess the adjusted effect of number of morbidities on disabilities and psychological distress by controlling other socio-economic covariates (age, sex, marital status, caste, education, wealth quintile, state of economic independence, and living arrangement.

Table5.6 Logistic regression analysis relating number of medical conditions to disability and psychological distress

Number of Morbidities	Physical disability[§] (Odds Ratio)	IADL disability[§] (Odds Ratio)	ADL disability[§] (Odds Ratio)	Psychological distress[§] (Odds Ratio)
No morbidity ®	1.000	1.000	1.000	1.000
One morbidity	2.144*	2.209*	2.043	4.899***
Two morbidities	10.062***	1.135	2.110*	5.135**
Three or more morbidities	11.918***	2.282**	6.672***	5.247**

**significant at 5 per cent level; ** significant at 1 percent level; ® Reference group*
[§]Adjusted for age, sex, marital status, caste, education, wealth quintile, state of economic independence, and living arrangement

Results show that number of morbidities has a positive association with various types of disabilities and psychological distress. Elderly having three or more morbidity are 12 times more prone to physical disability than those who do not experience any morbidity. Similarly elderly who are having three or more morbidity have experience double IADL disability than those who do not have any morbidity. ADL disability was 6 times higher, among the elderly having three or more morbidity as compared to those who do not have any morbidity. Psychological distress was also 5 times higher among the elderly having three or more morbidity compared to the elderly with no morbidity.

5.5 Discussion and conclusions

The present chapter examines the relationship between morbidity, disability and psychological distress among the elderly population. As ageing sets in, the elder population becomes more prone to morbid condition which can cause disability as well as psychological distress also. Result indicates that physical disability was higher among the males in comparison their female counterparts. Psychological distress was higher among

the females while non-functionality was higher among the males (ADL). In India, a study conducted by NSSO reveals that the prevalence of disability was higher among the males as compared to their female counterparts (NSSO, 2004). The reporting of males for both disability and morbiditywas also higher in comparison to their female counterparts (Pandey, 2011).Visual disability was highest among the elderly population, followed by walking, chewing and hearing disability. Visual and locomotive disability was the most prevalent physical disability among the sampled population. Loss of vision is one of the most common medical problems among elderly and it was positively associated with depressive symptoms (Verbrugge & Patrick, 1995). Horowitz (1995) found that elderly with vision-impairment are at the greater risk of depression than those with better sight. Treating depression may reduce the added disability that was associated with impaired vision (Rovner & Ganguli, 1998).In developing countries, the main causes of low vision and blindness are age-related macular degeneration (AMD), Glaucoma, Cataracts, pathologic Myopia and Diabetic Retinopathy (Garin et al., 2014).

The least prevalent disabilities among the elderly population were speech and memory.Studies also revealed that increased age among the elderly was the most important risk factor for deterioration of the functional state i.e. the loss of both ADL and IADL (Guralnik et al., 1993; Artı´s et al., 2005; La´zaro Alquezar et al., 2007).Results from the study indicate towards a positive association-ship of morbidity with disability and psychological distress. The medical conditions that were significantly associated with disability and psychological distress were: COPD, Hypertension, Alzheimer's disease, Cataract, Loss of natural teeth, Accidental injury, Skin disease and Paralysis. The prevalence of physical disability (70%) and psychological distress (50%) was significantly higher among the rural elderly in Odisha. Age was positively associated with psychological distress, morbidity and disability. Evidences from other studies shows that chronic conditions, which were particularly related to disability are: Stroke, Diabetes, Cognitive Impairment, Arthritis and Visual Impairment (Jagger et al., 2007; Andrade, 2009; McGuire et al., 2006). Since there is a positive correlation between morbidity, disability and psychological distress, the health planners and policy makers have to consider all the three aspects comprehensively while addressing the issue of elderly health at both micro and macro level.

CHAPTER VI

HEALTHCARE UTILIZATION AND FINANCING PATTERNS AMONG THE ELDERLY

6.1 Introduction

The previous chapter analysed the relationship between morbidity, disability and psychological distress. This chapter examines the healthcare utilization and financing patterns among the rural elderly. Healthcare, like all other markets, consists of a need, demand, and supply of the product. Here, need is directly associated with the health conditions of the population while demand and supply are related with what people wants for their health and the availability of the healthcare facilities (Jahangir, 2012). Health system is called unbiased when it also ensures that all the households are well protected from the adverse effect of the healthcare payments so that economic well-being of the households should be promoted and protected (Graeve, Schokkaert, & Cantillon, 2003).

Financing for healthcare is one the most important aspects to be looked in the developed and developing countries. Financing directly or indirectly is dependent upon the income sources of the population (Abeysinghe & Lim, 2010). Health financing systems such as degree of reliance on Out of Pocket Expenditure (OOPE) also plays an important role in the process of financial protection (Xu et al., 2003, 2007). OOPE is the major health financing mechanisms across most of the South East Asian and other developing countries (O'Donnell et al., 2005; O'Donnell, 2008; Leive et al., 2008; Jogelkar, 2008).

It is not easy for the households to cope up with the Out of Pocket Expenditure (OOPE) as it can result into financial hardships and poverty. OOPE are non-reimbursable fees which a patient or family is responsible for paying directly to healthcare providers or practitioners, without mediation of a third party. It often occurs, when publicly funded facilities are unable to provide the required healthcare services for free, subsidized or through insurance.

Ageing is directly or indirectly associated with increase in the prevalence of disease and (Paramo, 2013). Increase in age causes several problems related with the physical and

mental wellbeing (Young 1997; Bhatia et al., 2007). Health problems lead to different types of disabilities among the elderly population (Andrade, 2009). Vulnerable health is the main cause of increase in the healthcare spending. Therefore old age is the major determinant of the increase in the spending on health care.

Micro level studies suggest that health payments also differ with the certain specific characteristics of the households. Poorer and elderly household's faces more financial risk and they need more protection to benefit fully from the healthcare services (Su et al., 2006; Habicht et al., 2006; Cavagnero et al., 2006). Catastrophic health expenditure is a key measure of the financial protection as it indicates to what extent the households are protected from the unjust payments (Murray et al., 2003).

Medical care of elderly population is more expensive due to severity of disease and frequent episodes of hospitalization (Reinhardt, 2003). Most of the literature is available from the developed countries, which provides linkages of population aging and health spending. These studies recognized a higher per capita healthcare expenditure among elderly, increase in age-sex specific healthcare expenditure and expected increase in healthcare cost in coming decades (Cutler &Meera, 1997; Fuchs, 1998; Mahal &Berman, 2001; Fogel, 2003).

Like many developing countries, India is also undergoing rapid demographic and epidemiological transition. On one hand the life expectancy is increasing while on the other hand the burden of Non-communicable Diseases (NCDs) is on the rise. Owing to the twin challenges of epidemiological transition (causing predominance of NCDs and changing age structure towards a visible ageing population), the healthcare implications for elderly population are manifold (ORGI, 2012).

The pattern of current health spending in India suggests that 71% of health expenditure is met by households, 20% by government (centre, state and local bodies), 6 % by firms and 2 % by external flows (MOHFW 2009). While there has been an increase in government health spending over the years, the focus remains on maternal and child health. On the other hand, out of 10.3 million deaths in 2005, 53 % were due to NCDs (Reddy et al.,

2005). It is projected that by 2030, 45% of India's health burden will be borne by older population (WHO, 2010).

Health spending differs significantly among elderly population as they are not homogenous group of population in India. With increase in the elderly population there will be increase in the health care costs also (World Bank 1993). There are evidences of deterioration (Ranjan, 2004; Rajan, 2008; Alam, 2008; Dasgupta & awhney, 2001) in the physical and mental health of the elderly population in India.

As per the WHO estimates, approximately 3.2% Indians would fall Below the Poverty Line (BPL) due to high medical expenditure. About 70% of Indians are spending a large proportion of their income on healthcare and purchase of medicines (WHO, 2012). The OOPE accounts for an average increase in poverty by as much as 3.6 % in rural areas and 2.9 % in urban areas respectively (Duggal, 2009).

The high health care expenditure are attributed to the falling health among elderly, higher disability in later life, higher prevalence of chronic disease and co-morbidity among elderly (Gupta & Sankar, 2003; Medhi &Mahanta, 2007; Schoenberg et al., 2007). Household expenditure on health care, mainly direct expenditure on health is directly related to the public spending on health i.e., direct expenditure reduces with increase in public spending on health.

Limited numbers of studies are available which focuses upon the health-spending pattern among the elderly in India by keeping in view the severity of the nature and type of diseases. The objective of this chapter is to examine the pattern of health care spending and various covariates of OOPE among the elderly population.

OOPE are non-reimbursable fees which a patient or family is responsible for paying directly to health practitioners or suppliers, without intervention of a third party. The institutional expenditure was for 365 days recall period so for the purpose of study it has been converted in 30 days recall period. The approach to measure OOPE for healthcare payments has adopted from Wagstaff and Doorslaer (2003) in the World Bank document. Following method is used to measure the OOPE payments where OOPE is per capita

medical expenditure and is obtained by adding per capita institutional and non-institutional medical expenditure for the recall period of 30 days.

6.2 Conceptual framework for the study

Andersen and Newman's model of healthcare utilization was widely used to explain the pattern of utilization of healthcare services by the general population (Jahangir, 2012). Number of studies has evaluated these determinants and its effect on the OOPE among the households.

It is also evident from the literature that there are differences in healthcare utilization pattern among the different socio economic and age groups especially among the females and elderly population (Montoya, 2008).This study is an attempt to apply the Anderson's model of healthcare utilization and financing among the rural elderly.

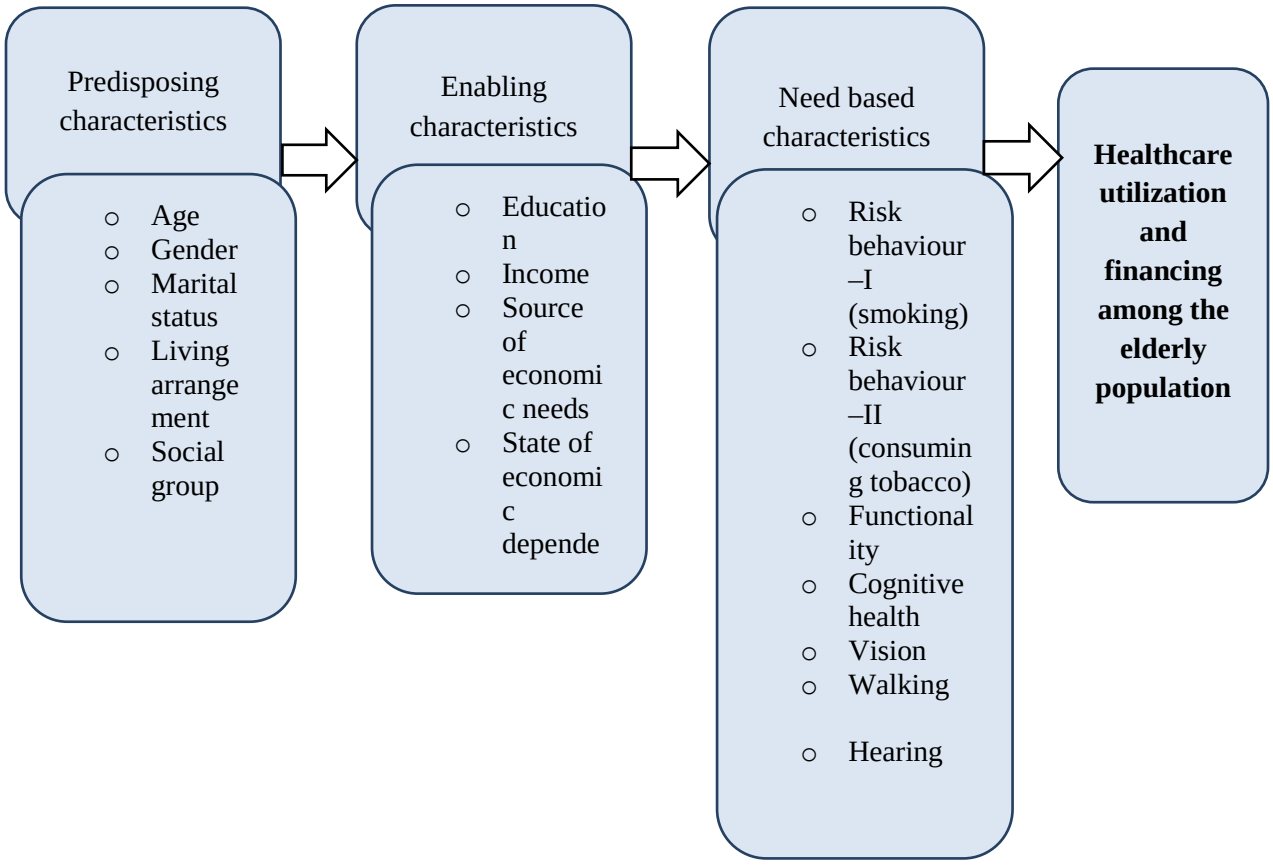
The Behavioural Model of healthcare utilization was initially developed by Andersen in the late 1960s. This model suggests that use of healthcare services by households is a function of their predisposition to use services, factors which enable them to use these services and their need for health care. In this model, use of healthcare services is categorised as a function of basically three main elements: predisposing, enabling and need factors.

Predisposing factors include demographic variables (gender, age, marital status), and socioeconomic status (social group, living arrangement). Enabling factors include items such as the individual's income, perceived health status (morbidity), state of economic dependence and source of economic need. Perceived health may include self-rated health status of the population.

Need factors, include the individual's perceived healthcare need and other indicators of their health status. Self-rated health can be measured through physical (vision, hearing, walking), psychological (cognitive health) and functional (ADL) health status of the elderly population in the sampled area. Indicators of health among people are risk behaviour (smoking and consuming tobacco).

Anderson's Health Behaviour Model has defined utilization by need, predisposing, and enabling determinants. We hypothesize that behavioural factors such as predisposing, enabling and need, are associated with utilization of healthcare services and financing pattern among the elderly population.

Figure 6.1 Andersen's Behavioural Model of health services utilization (adapted from Wolinsky, 1988)



6.3 Variable specification

In this chapter we have taken OOPE as our dependent variable. In order to determine the OOPE we have taken both inpatient and outpatient for the elderly. For calculating outpatient service utilization, respondents were asked following questions: "Were you sick for any time during last one month?" For inpatient service utilization respondents were enquired about the following: "Did you have any major health problem during the last 365 days requiring hospitalization?" For both inpatient and outpatient care, last episodes of illness was taken into consideration.

For calculating monthly per capita healthcare expenditure we have converted inpatient care services into monthly as they are calculated on the yearly basis. Then both inpatient and outpatient services were added to calculate the total monthly OOPE and later this was divided by the total number of household to find the monthly mean healthcare expenditure.

Based on Anderson's model, the factors determining the healthcare demand were categorized into predisposing, enabling and need factors. We included age, gender, marital living arrangements and social groups variables as predisposing factors; education, income, source of economic needs, state of economic dependence were considered as enabling factors to OOP health expenditures. Life style indicators (smoking, tobacco usage), functionality, cognitive health, vision, walking, and hearing and morbidity status were included as need variables.

6.4 Statistical analyses

Our outcome variable OOP health expenditure was typically non-parametric and positively skewed with influential outliers. Traditional ordinary least square (OLS) regressions with log-transformation and retransformations are too inconsistent to handle skewness in the data and provide inferences in natural units of mean expenditures (Manning, 1998). Generalized linear regression models (GLRM) are flexible to handle skewed expenditure data and avoid the issue of outcome transformation (Basu, 2009, Gregori et al., 2011). Survey GLM with gamma distribution and log link function (Kilian et al., 2002), was employed to assess various determinants of OOPE and account for the complex survey design. We tested multi-collinearity for all independent variables, and in no case was the tolerance value less than 0.1 or the variance inflation factor (IVF) greater than 10.

6.5 Results

6.5.1 Healthcare utilization pattern among elderly

It is well-mentioned fact that the elderly are more prone to diseases due to physical and mental health and in turn, it causes more expenditure on the prevention of ailments. In comparison to the urban areas, the unavailability of transportation, larger geographical

distances to the health facility, higher rate of risk behaviour, limited workforce and financial barriers are the main cause behind the poor health outcomes among the rural elderly (Durazo et al., 2011). Females are the most disadvantaged group in the rural areas in terms of health status (WHO, 2009).Given the morbidity level of the elderly, it is necessary to know that which type of healthcare facilities are more accessed by the elderly i.e. private or public. If the elderly are availing more public facilities, in that case there healthcare expenditure is less in comparison to those who sought care from the private healthcare providers.

Figure 6.2 Healthcare providers in the last episode of illness

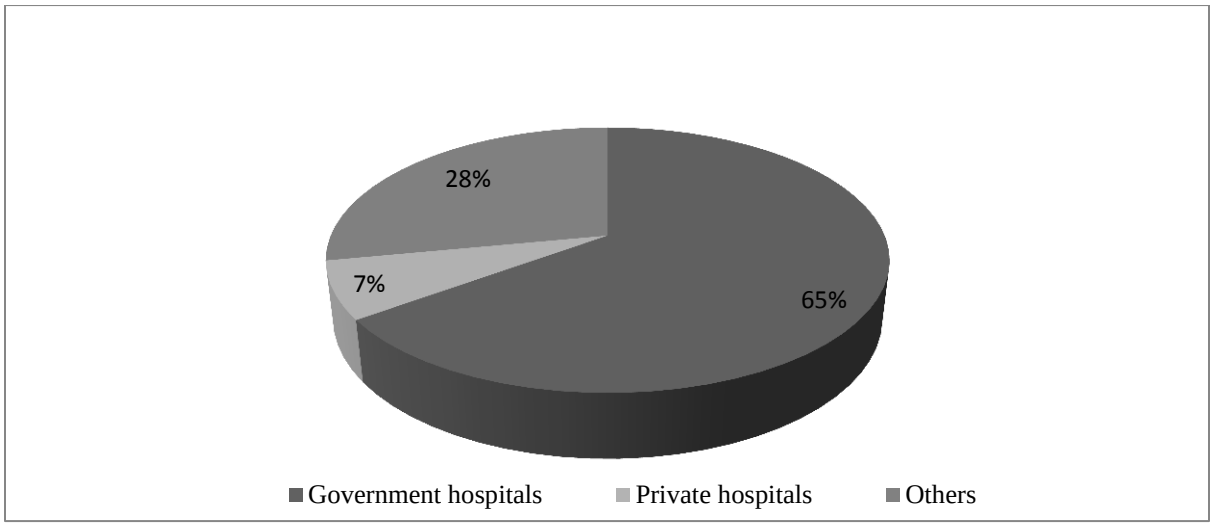


Figure 6.2 shows the choice of healthcare providers for outpatient visits among the elderly in the last episode of illness. First preference of the elderly regarding choice of healthcare providers was government hospitals (65%). Reasons for preferring public healthcare providers over private and others may be financial or availability of the facility. Least preference was given to the private healthcare providers for the treatment of ailments.

6.5.2 Sources of healthcare financing

The healthcare needs of elderly population (for both inpatient and outpatient) are catered by different sources like self-financing, spouse, children (son, daughter, son in law/daughter in law) and others figure 6.3 & 6.4. It is evident from the results that major

source of financing for elderly population was their son followed by self-financing, their spouse and son in law/daughter in law for healthcare in the last episode of illness. Contribution of daughters and other sources was least in the financing of healthcare needs of elderly population.

Figure 6.3 Sources of healthcare financing among the elderly population in last episode of illness (In-patient)

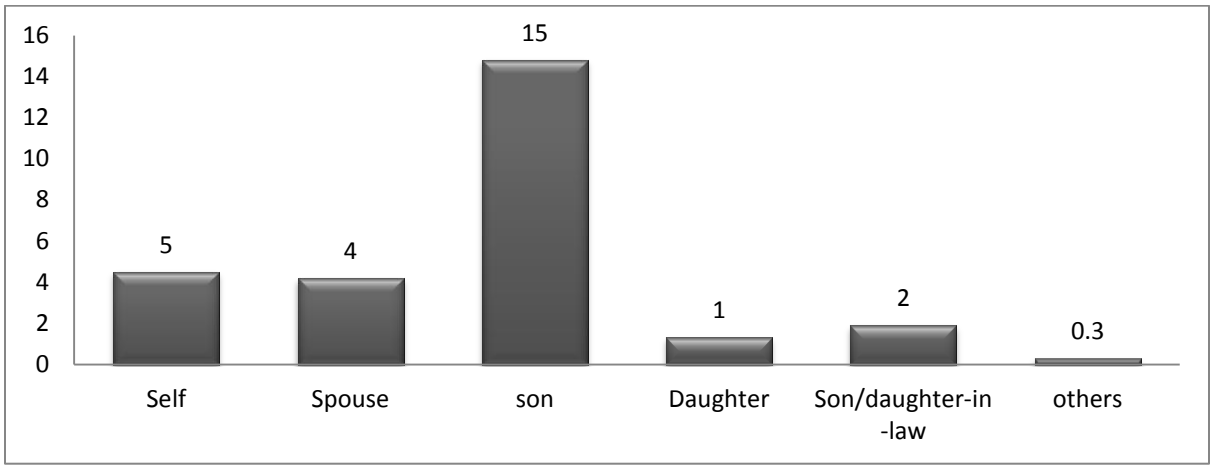
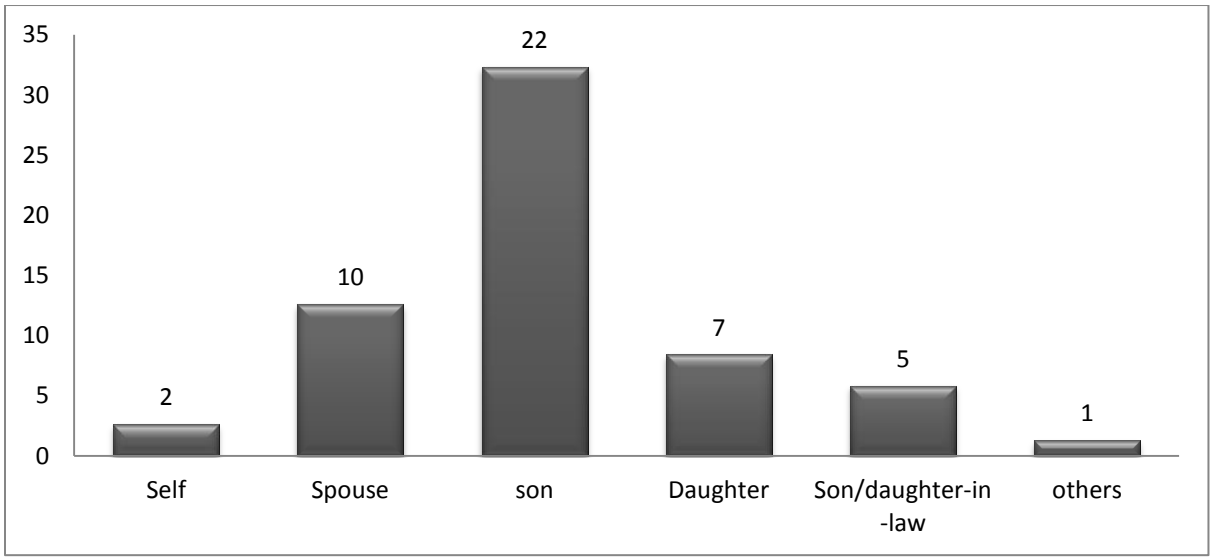


Figure 6.4 Sources of healthcare financing among the elderly population in last episode of illness (Outpatient)



Main financers for the healthcare needs among the elderly population for the inpatient care were, son, spouse, daughters and son/daughter in-law. The self-financing and other sources were contributing least in the financing needs of the elderly population in the

district. Similarly for the outpatient care also main financer was son followed by the contributions from spouse and son/daughter in-law.

6.5.3 Treatment seeking behaviour for the last episode of illness

The treatment seeking behaviour of the elderly in terms of outpatient services shows that they (figure 6.5 and 6.6) seek treatment mainly for the ailments such as high Blood Pressure (BP) (27%), fever (23%), stomach infection (18%), injury due to fall (14%), Typhoid (14%) and others (malaria and acidity 4%). Similarly inpatient services utilization among the elderly for the treatment of ailments such as Asthma (31%), COPD (27%), injury due to fall (19%), Urinary tract infection (15%) and others (paralysis and accidental injury, 8%) was higher.

Figure 6.5 Outpatient visits for various ailments in the last episode of illness

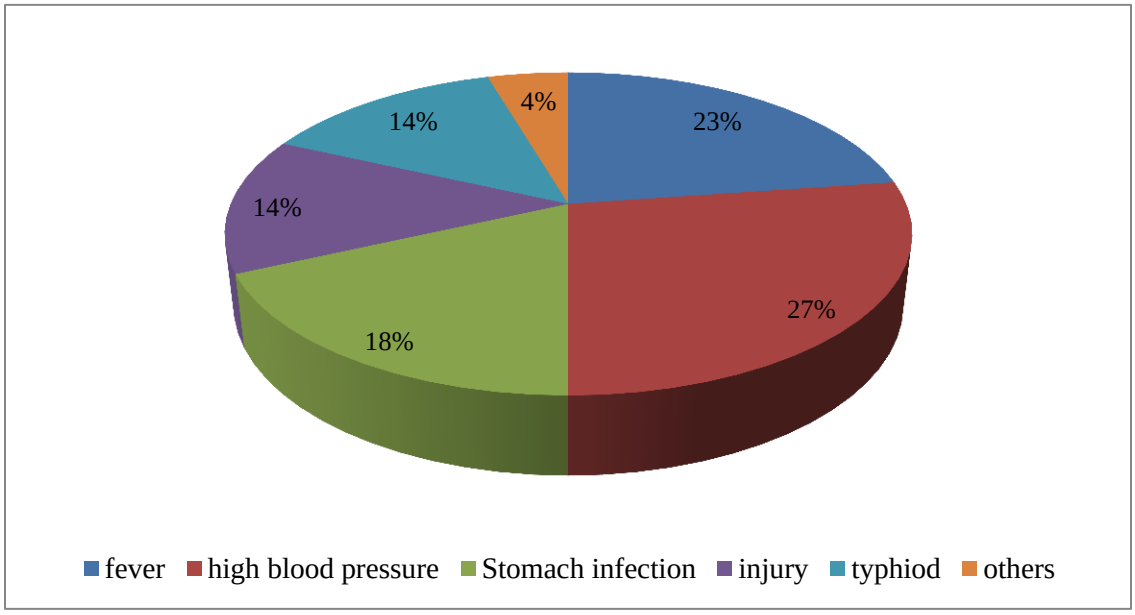
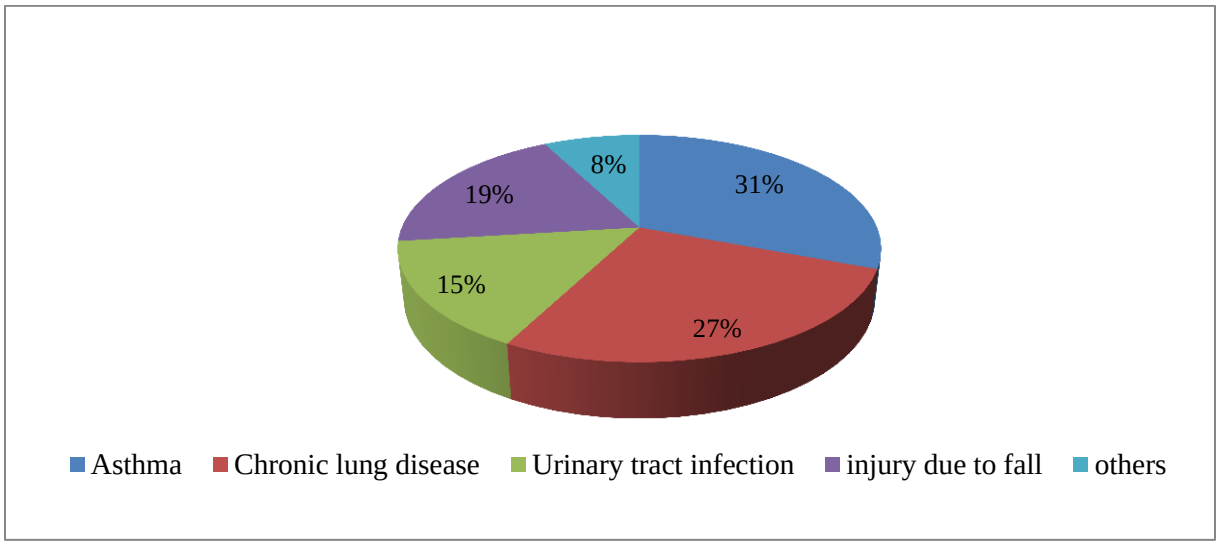


Figure 6.6 Inpatient visits for various ailments in the last episode of illness



6.5.4 Socio-economic differentials in OOPE spending

The overall monthly mean healthcare expenditure among the elderly was INR 452 (Table 6.1). Spending was higher among the elderly in the age group of 60-70, males, married elderly, literate, elderly living alone, having bank balance or savings, not depending on others and belonging to OBC social group. Those elderly who are more prone to risk behaviour like smoking and chewing tobacco are spending more. Similarly non-functionality, bad cognitive health, low vision, walking disability, and hearing defect are spending more than their counterparts.

Table 6.1Mean health expenditure by different socio-economic covariates

Covariates	Average mean health spending
age	
60-70 years	555
70+ years	250
Gender	
Males	482
Females	422
Marital status	
Currently married	463
Widowed/separated/divorced	435
Education	
Literate	531
Illiterate	401

Covariates	Average mean health spending
Family Income	
High income	480
Low income	449
Living arrangement	
Living alone	509
Living with son/daughter/son in law/daughter in law/relatives	447
Source of economic needs	
Bank balance	1350
Others	437
State of economic dependence	
Not depending on others	825
Fully depending on others	373
Social group	
Other Backward Caste (OBC)	590
Others (SC/ST/ General)	414
Risk behaviours 1 (Tobacco)	
Consuming Tobacco	544
Not consuming Tobacco	398
Risk behaviours 1 (Smoking)	
Smoking	627
Not Smoking	373
Functionality	
Not functional	655
Functional	390
Cognitive health	
Bad	482
Good	422
Vision	
Bad	487
Good	405
Walking	
Problem	466
No problem	425
Hearing	
Unable	628
Able	391
Multi-morbidity	
Multiple morbidities	645
Otherwise	198
Total out of pocket expenditure (OOPE)	**452**

6.5.5 Results of the GLRM model

We presented the bi-variate and multivariate analyses for the factors associated with OOPE among the elderly participants in Table 6.2.If the beta value is positive, the independent variables are positively associated with OOPE and vice versa. The bi-variate analysis shows that most important factors which are influencing the average healthcare expenditure among the older people are: age (β= 0.80 (0.34- 1.26), ρ=0.00), saving or bank balance (β= 0.79 (0.24- 1.35), ρ=0.01), risk behaviour i.e. smoking (β= 0.52 (0.06- 0.98), ρ=0.03), non-functionality (β= 0.52 (0.01- 1.03), ρ=0.05), hearing defect (β= 0.47 (-0.01- 0.95), ρ=0.05) and multi-morbidity (β= 0.47 (0.25- 0.68), ρ=0.00). Even after controlling the confounding variables, under the multivariate analysis, age (β= 1.51 (0.88- 2.13), ρ=0.00), saving or bank balance (β= 0.49 (-0.29- 1.28), ρ=0.02), risk behaviour i.e. smoking (β= 0.49 (-0.16- 1.14), ρ=0.03), non-functionality (β= 0.87 (0.04- 1.69), ρ=0.04), hearing defect (β= 0.62 (-0.20- 1.43)ρ=0.04) and multi-morbidity (β= 0.53 (0.22- 0.84), ρ=0.00) are influencing the spending pattern of the elderly on healthcare.

Table 6.2 Factors associated with OOPE among older participants (>60 years) (n=310)

	Bivariate analysis		Multivariate analysis	
Explanatory variables	β (95% CI)	ρ values	β (95% CI)	ρ values
Educated	0.28 (-0.14- 0.70)	0.19	0.67 (-0.05- 1.38)	0.04
Age (60-70 years)	0.80 (0.34- 1.26)	0.00	1.51 (0.88- 2.13)	0.00
Gender(Male)	0.13 (-0.28- 0.55)	0.53	0.32 (-1.01- 0.37)	0.36
Widowed/separated/divorced	-0.06 (-0.49- 0.36)	0.77	0.05 (-0.66- 0.76)	0.89
Income (high)	0.07 (-0.70- 0.83)	0.87	0.55 (-0.59- 1.69)	0.34
Living alone	0.13 (-0.65- 0.91)	0.74	0.40 (-0.79- 1.59)	0.51
Economically independent	1.13 (-0.54- 2.80)	0.19	0.66 (-1.71- 3.03)	0.59
Spending from savings	0.79 (0.24- 1.35)	0.01	0.49 (-0.29- 1.28)	0.02
Other Backward Caste (OBC)	0.15 (-0.27- 0.57)	0.49	0.40 (-0.22- 1.02)	0.21
Smoking	0.52 (0.06- 0.98)	0.03	0.49 (-0.16- 1.14)	0.04
Consuming tobacco	0.31 (-0.11- 0.73)	0.15	-0.14 (-0.77- 0.49)	0.67
Non-functional (ADL score)	0.52 (0.01- 1.03)	0.05	0.87 (0.04- 1.69)	0.04
Good cognitive health	-0.13 (-0.55- 0.28)	0.53	0.06 (-0.56- 0.67)	0.85
Poor vision	0.19 (-0.24- 0.61)	0.39	0.11 (-0.55- 0.77)	0.74
No walking disability	-0.09 (-0.56- 0.37)	0.70	-1.06 (-1.99- -0.13)	0.03
Hearing defect	0.47 (-0.01- 0.95)	0.05	0.62 (-0.20- 1.43)	0.04
Multi-morbidity	0.47 (0.25- 0.68)	0.00	0.53 (0.22- 0.84)	0.00

Apart from bivariate analysis the two variables which had a significant influence on the spending pattern among the elderly was education (β= 0.67 (-0.05- 1.38), ρ=0.04) and lack of physical disability i.e. walking (β= -1.06 (-1.99- -0.13), ρ=0.03).

6.6 Discussion and conclusions

Utilization pattern of the healthcare services as per Anderson's model among the elderly shows that the most significant predisposing factor was age. As per our findings there was an inverse relationship between age and health expenditure. As the age increases people are reluctant to spend more (Reisi et al., 2014). Caregivers use to think that the remaining life expectancy of the elderly in the age group of above 70 years was uncertain and cannot be predicted. Among the enabling factors bank balance and savings plays an important role in the determination of healthcare expenditure. Need factors which were significant are: risk behaviour, non-functionality, hearing defect and multi-morbidity. Other factors such as age, gender, education and social group also influences the spending pattern among the elderly (Morales, 2002).

Need factors are the major cause behind the extent of spending on health care. If an elderly was more prone to diseases and faces the problem of multi-morbidity, they were spending more and vice versa.Risk behaviour among the elderly makes them more prone to diseases such as COPD, Heart disease, Lung disease and Arthritis. The economic cost of risk behaviours such as smoking and tobacco consumption remains hidden. On one hand, they have to spend on the consumption of these products and on the other they have to spend more when they face hazardous health consequences. There was inclusion of twin cost in the risk behaviour (Yao, 2014).

Non functionality among the elderly also causes them to spend more on the healthcare. As disability increases, healthcare spending also increases. As disability is a long term health problem, the expected cumulative health expenditure also increases (Michael et al., 2004; Spillman, 2004). Hearing defects among the elderly makes them to spend more on the visits of the healthcare providers at least once in a year (Chia, 2007; Weinstein, 2015).

Results of the study also indicate that more than half of the elderly population was suffering from the multi-morbidity. In addition multi-morbidity increases the inpatient cost and requires frequent episodes of hospitalization (Bahler et al., 2015). Education also plays an important role in the healthcare expenditure. Those people who are illiterate spend less, while literate people spend more on the health care. We have included people as literate who have completed at least primary education or above. Health expenditure also varies as per the social group affiliation. In our study the population composition of Bargarh district in Odisha was dominated by the OBC population and they were economically well off people. As per our findings, spending on healthcare was maximum among OBC group. General category and SC/ST population was spending less on the healthcare (Banjare, 2014).

In the changed world demographic scenario, increase in the NCDs and medical costs, the health expenditure would increase in the coming time. Increased health expenditure would force the households and individuals into the trap of poverty. Maximum of the households are forced to meet their healthcare needs from their own pockets as in India public spending on health and insurance coverage was very low. These factors results into increased health spending by the households as they have to sell their assets and resort to borrowings for meeting their healthcare needs (Garg and Karan 2009; Peter et al., 2001).

The healthcare utilization and financing pattern shows that predisposing, enabling and need factors are equally important and determines the OOPE among the elderly. The majority of rural elderly are seeking treatment from the government facilities and not able to afford the private healthcare services. The health spending depends upon various factors such as income of the households, nature of illness, health facility and quality of care. With the increase in the health spending by the government and increase in the insurance coverage can help in reducing OOPE by the households. Elderly population needs better public health facilities, more public spending and better allocation of the resources to reduce the burden of health spending on the elderly. There should be promotion of Public Private Partnership (PPP) among the healthcare providers especially in the rural areas. The local agencies and government to educate the elderly regarding the

risk behaviour like use of tobacco and smoking should adopt promotional strategies. There is an immediate need to relook at the existing pension schemes especially in the rural areas to manage the healthcare needs of elderly.

CHAPTER VII

ASSOCIATION OF ELDERLY ABUSE WITH MORBIDITY AND DISABILITY

7.1 Introduction

This chapter makes an effort to examine the effect of elderly abuse on morbidity and disability status of the elderly. Elderly abuse is not a new phenomenon, but has remained hidden considerably, however, the disquiet against elderly abuse is growing and it is now accepted as a significant issue in all societies globally (Mellor &Brownell 2006; Brandl et al., 2007; Phelan 2010). Elderly abuse is defined as "a single, or repeated act, or lack of appropriate action, taking place within any relationship where there is an expectation of trust which causes damage or anguish to an older person". Elderly abuse can take various forms such as physical, psychological or emotional, sexual and financial abuse, either intentional or unintentional (WHO, 2012).

According to Wolf (1996) major type of abuse faced by elderly are: physical abuse, verbal abuse, economic abuse, psychological abuse (showing disrespect), neglect and sexual abuse. Physical abuse is defined as the use of force that may result in any form of injury or pain. It may include hitting, beating, pushing, shoving, shaking, slapping, kicking, pinching, and burning. Verbal abuse includes use of foul language while addressing the elderly, yelling, threats and continuously abusing the elderly without reason. Psychological abuse refers to any form of mental anguish, such as keeping the elderly person aloof or isolated from others which causes psychological distress leading to serious issues such as depression. Neglect is defined as the refusal or failure to fulfill any or all obligations or duties towards an elderly such as unattended health issues, poor hygiene or lack of care giving. Financial or economic abuse is defined as the illegal or improper use of an elder's funds, property, or assets. Sexual abuse constitutes any form of sexual assault or rape on an elderly. Abuse can be intentional or unintentional which causes or attempt to inflict pain and suffering to the elderly.

According to literature the major barriers which the elderly are facing while reporting abuse and in escaping the abusive situations are bad physical health, lack of awareness of what constitutes abuse, lack of knowledge about their rights, social isolation or fear of separation, the need to preserve a relationship and fear or shame to report (Bagshaw, Wendt & Zannettino, 2007). Abuse is a multidimensional phenomenon which requires psychological, medical, social, political and legal interventions and actions (Wolf, 2000; Kurrle, 2004). Abused elderly usually hide signs of abuse due to social stigma and shame associated with the acknowledgment of the fact that their own children are neglectful towards them. Abused elderly have very low self-esteem and show signs of depression eventually leading to other psychological problems. They also find it difficult to adjust with the society.

Aged individuals need to make fresh adjustments with the society due to change of their role in the family or society (Landis, 1942; Jamuna, 1984). Deteriorating condition of health, poor living conditions, economic problems, social isolation, social security and medical care are usually the factors that influence adjustment in old age (Hurlock, 1976). As the aged males are physically "retired" and economically vulnerable due to absence of income, loss of occupational identity, and fall in social status, greater dissatisfaction in life result in lower social adjustment in males than females (Nathawat & Rathore, 1996).

7.2 Prevalence of elderly abuse

Many studies from developed world like United States, Canada, Sweden, Denmark and Finland show that the prevalence of elderly abuse ranges from 3-16% (Pillemer and Finkelhor, 1988; Vida et al., 2002). Psychological and financial abuse was the most common abuse among the elderly (Hirseh &Brendebach ,1999). A study in Sweden reported that 11% of the institutional staffs were aware of elderly abuse and about 2% of them had themselves abused some or the other elderly (Saveman et al., 1999). In Asian countries such as Japan, the prevalence of elderly abuse is approximately 4% (Tyan, 1994)

Help Age India (2011) conducted a study in twelve major cities of India and reported the prevalence of different kinds of elder abuse. The highest was verbal (60%), followed by physical (48%), emotional (37%) and economical (35%) and another 20% felt neglected by family members. A study done in Chennai for elderly mistreatment among 400 elderly living in a community revealed that verbal abuse was the most common followed by financial abuse. Women were more prone to abuse than men and other factors associated with abuse were social support and bad physical health (Srinivasan&Alex, 2008).

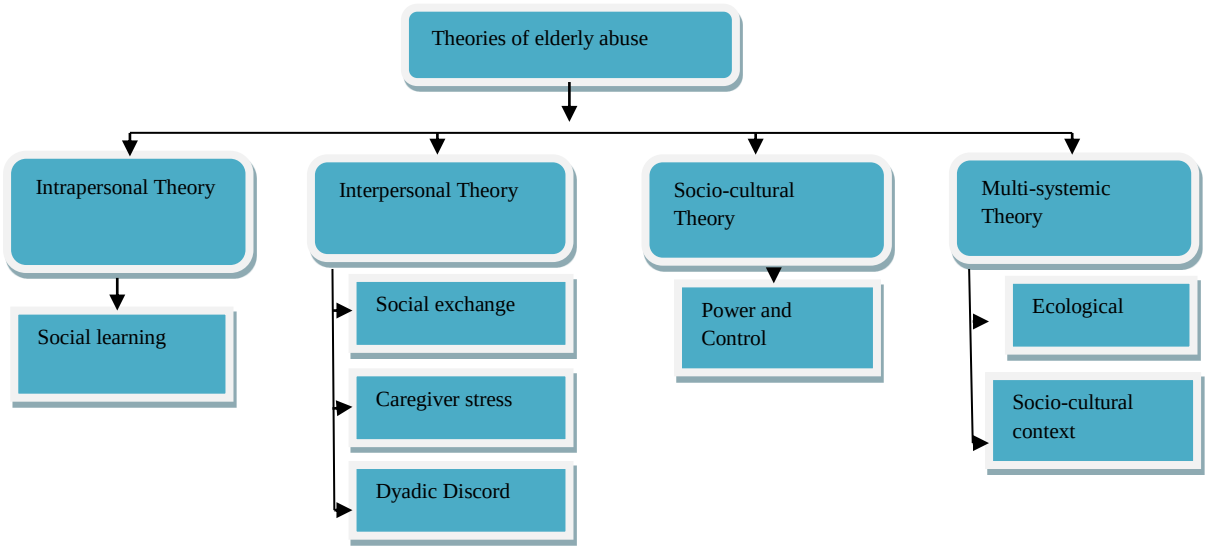
7.3 Health outcomes of elderly abuse

Literature on health outcomes associated with elder abuse is limited. Few studies suggest that elderly abuse were significantly associated with shorter life spans after adjusting for other factors related to mortality in older adults (Lachs et al., 1998).Elderly abuse led to detrimental cognitive and physical function in the elderly (Dong, 2009; Schofield& Mishra, 2004). There is a strong evidence of an association between elder abuse and morbidity. A study from Australia and Netherlands found that elder abuse is strongly associated with physical health status and cognitive health status (Lachs et al., 1998;Comijs et al., 1999). The negative health outcomes of elderly abuse are Injuries, Gastrointestinal Disorders, Fatigue, Headache, High Blood Pressure, Heart Problems, Chronic Pain and Psychological Distress, including Depression and Anxiety (Fisher & Regan, 2006; Dong X et al., 2012; Schonfeld et al., 2006). Research also suggests that abused elderly frequently used health services and have more OOPE (Buri et al., 2006). Elderly facing coercion and dejection are more prone to disability (Schofield, Powers & Laxton, 2013). Elderly abuse is associated with psychological distress leading to self-neglect. This study is of its own kind to examine the effect of elderly abuse on morbidity and disability. The long term cost of both morbidity and disability is important to investigate to get the real picture. Morbidity and mortality risk is associated with elderly abuse and they are prominent among the elderly who have lower levels of social network and social adjustment problems (Dong et al., 2011).

7.4 Major theories of elderly abuse

There are various theories on elderly mistreatment, but four major theories of elderly abuse are discussed in brief as under.

Figure 7.1 Major theories of elderly abuse



Abuse cannot be understood by looking stringently at any one theory of abuse. In this section, four categories of theories of abuse have been summed up into interrelated concepts. The first attempt in understanding the causes of elderly abuse starts at an individual level. Intrapersonal theory of elderly abuse explores the mindset of an individual and its relationship with abusive behavior pattern. *Social Learning Theory* as explained by Albert Bandura in 1973 indicates that violence is a learned behaviour and it is passed from one generation to the other. For example, a child observes how his parents treated his grandparents and learns from them (Quinn &Tomita, 1997). In future this child is expected to repeat similar behavior.

The Interpersonal theory of elderly abuse is the next level which discusses the communication and negotiation pattern between the caregiver and elderly. It includes *Social exchange theory*, developed by George Caspar Homans in the year 1950s. Social behaviour is an exchange process of both material and non-material goods. According to this theory when a person receives a lot he is under the pressure to give much in return. The person who is care giving has the power advantage over the receiver and at times

they misuse this advantage thinking that there is no harm in being unjust (Phillips, 1986). It is important to note that the abused elders are often dependent on the perpetrators (Wolf & Pillemer, 1997).*Caregiver Stress Theory* explains that elderly abuse occurs when the caretaker fails to manage his care giving responsibilities (Wolf, 2000). The drawbacks of this theory are that it blames victims and supports abuser who uses the victim as a scapegoat for their frustration (Brandl, 2002).*Dyadic Discord Theory* asserts that the relationship conflict and behaviors are the central constructs in family violence (Riggs & O'Leary, 1996). As per this theory, elderly abuse is always unidirectional from "perpetrator" to "victim".

Socio cultural theory includes *Power and Control Theory* which highlights how the abusers use the pattern of coercive tactics to gain and maintain power and control in the relationship. Earlier this power differential was termed as generation gap but later on it was reformulated as 'ageism'. Ageism is the tendency to dismiss older people as less competent. Perpetrators often believe they have exclusive rights entitling them to mistreat or neglect the older adult.

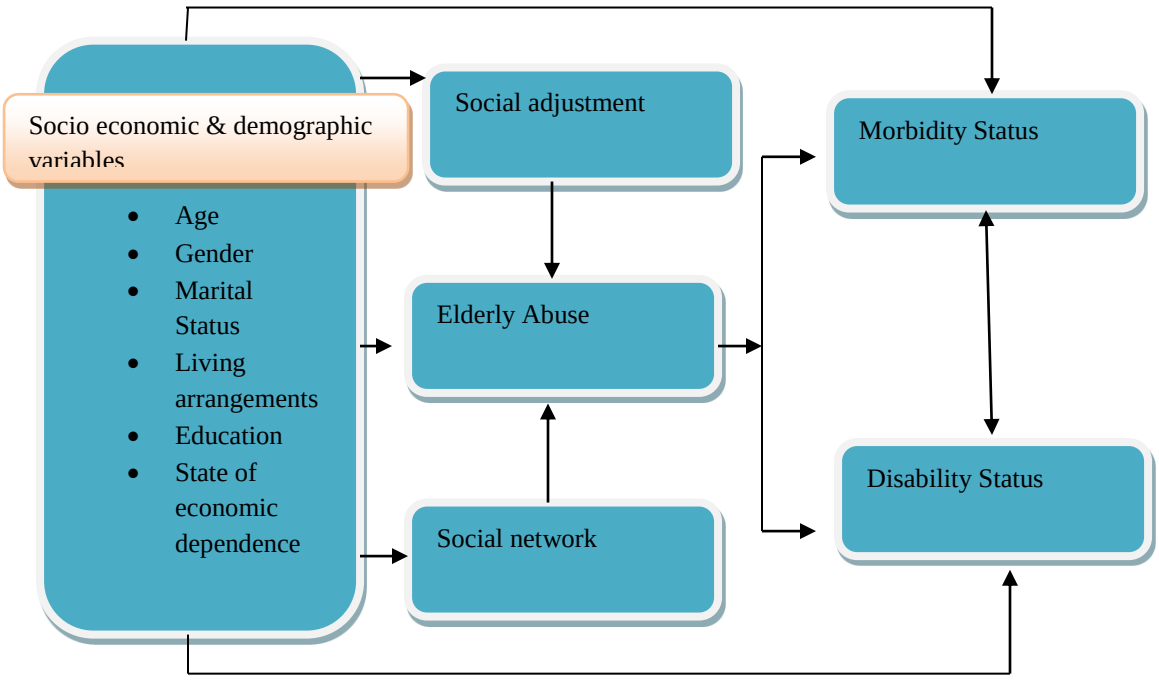
Multi-systemic theory has two underlying theories. *Ecological theory* was developed by Bron fenberenner in1979 it has four concentric rings. The outer ring is termed as macro system which constitutes age, gender inequality, the second ring is termed as exosystem which comprises of economic environment, third ring microsystem consists of family characteristics and finally the inner most circle the ontogenetic includes affect, behavior and physiology. *Socio cultural Context* theory explores the effect of society and culture with context with environment on elderly abuse. It was inspired by George Engles (1977) bio-psychosocial model. It depicts a transactional process unfolding over time among the elderly; his/her trusted other and other interested parties. The model introduces social embeddedness of the elderly and of trusted other. It captures demographic characteristics of both the parties. These factors impact the status inequality and relation type, which affects the power and exchange dynamics. The outcomes are physical and emotional health and happiness of the elderly and the trusted other, elderly abuse the durability of the care giving relationship, and sense of security and trust.

The objective of this chapter is two folds: first to examine the various socio demographic factors associated with elderly abuse; second to see the effect of elderly abuse on morbidity and disability.

7.5 Conceptual framework

This conceptual framework is partially derived from the ecological theory of elderly abuse. Various socio economic and demographic covariates that determine elderly abuse are shown in figure 7.2. Elderly abuse is influenced by other two important dimensions i.e. social adjustments and social network. Social network and social adjustments are critical component in the area of abuse, mental health and depression among the aged (Grocki, 2009). Social network is of paramount among elderly particularly who are experiencing abuse and have social adjustment problems (Kafestios & Siderius, 2006). Social network and good social adjustment is linked with lower cases of elderly abuse, improved psychological health such as decreases in symptoms of depression and anxiety, improvements in self-efficacy, better functionality and other emotional issues (Berkman, 2000). Subsequently elderly abuse effects morbidity and disability status among elderly.

Figure 7.2 Conceptual framework (partially derived from an ecological model of elderly abuse)



7.6 Methodology

7.6.1 Variables under study

As discussed earlier the objective of this chapter is to examine the effect of elderly abuse on morbidity and disability. The dependent variables are any morbidity and physical disability. The independent variables are various socio economic and demographic factors including two important covariates such as social adjustments and social network.

Elderly abuse was assessed by asking question: *'Have you ever faced any types of abuse or violence or neglect or disrespect by any person?'*. The response was dichotomous (Yes=1, No=0). Subsequently, information was collected on types of abuse (physical, verbal, economic, showing disrespect and neglect).

To measure the social network among the rural elderly we have asked questions such as: *Do you keep in touch with your relatives/ friends as often as you would like to?* The answers were on a dichotomous scale (yes/ No).The above mentioned scale for social network and social adjustment has been widely used in many large scale surveys in Indian context (e.g. WHO-SAGE, LASI etc.).Social network is defined as the characteristics of having assistance from family, friends, neighbors and other community members. Social support has a strong impact on an elderly individual. It acts as a stress buffering tool to help the elderly come out of any traumatic and critical situations of life (Sarason et al., 1990; Melchiorre et al., 2013). Lack of social support and social network leads to loneliness. Loneliness in old age is a risk factor of abuse and morbidity (Luo et al., 2012).

For social adjustment we have asked total fifteen questions related to oneself and his/her adjustment with the society such as: *(Do you make friend easily ?, Do you think person seek your advice fairly often ?).* The questions were both positively and negatively framed and the respondent has to mark 'Yes' or 'No' according to his wish or consensus with the question. If the respondent marked 'yes' for the positive question it was taken as 1 and if he/ she marked 'yes' for the negative question it was taken as 0 and if the respondent marked 'no' for the negative question it was taken as 1. The total score ranged from 0 to15.We have settled at 8 as a cut off value and defined those elderly above 8 score are adjusting well with the society and those below are having low adjustment with the society. The concept of social adjustment refers to fitting oneself into an ongoing

social situation. It includes three components but independent processes such as social integration referring to participation in activities and social interaction, evaluation referring to moral character and conformity referring to behavior acted in accordance with social norms (Bennett &Nahemow, 1965; Gorden et al., 2012).

7.6.2 Statistical analysis

First, chi-squire is estimated to see the bivariate analysis of factors associated with elderly abuse. Second, logistic regression is employed to examine the adjusted effect of elderly abuse on morbidity (experiencing any morbidity=1; otherwise=0) and disability (experiencing any physical disability=1; otherwise=0).While estimating logistic regression co-efficient, we tested multi-collinearity for all independent variables, and in no case was the tolerance value less than 0.1 or the Variance Inflation Factor (IVF) greater than 10.

7.7 Results

7.7.1 Socio-economic differentials in elderly abuse

Table 7.1 shows the percentage of abuse with respect to various socio-economic and demographic factors.

The prevalence of elderly abuse in the rural setting was 54% and females were more abused than males. Elderly who are not married i.e. widowed/Divorced or separated are more abused than those who are married. Illiterate elderly are more abused than literate. Elderly belonging to the poorest wealth quintile are the most abused. Elderly who are fully dependent on his/her caregiver are more abuse than those who are not dependent or partially dependent. Elderly who are living alone are the most abused. Elderly having bad social adjustment score are the most abused and those who have no social networks are also abused in comparison with those who are having social networks.

Table 7.1 Percentage of elderly experiencing any type of abuse by selected socio economic and demographic factors

Covariates	%	ρ - Value	N
Sex			
Male	48.4	< 0.058	153
Female	59.2		157
Age of the respondents			
60-65 Years	49.5		95
65-70 Years	66.4	< 0.004*	110
70+ years	64.8		62
Marital Status			
Currently married	51.9	< 0.416	187
Widowed/Divorced or Separated	56.9		123
Education status of respondents			
No formal education	56.1		187
Less than primary	58.1	< 0.047*	86
Primary school completed	30.4		23
Secondary school and above	35.7		14
Wealth quintile			
Poorest	77.0		61
Poorer	73.3		60
Middle	49.2	< 0.000**	65
Richer	45.9		61
Richest	25.4		63
State of economic dependence			
Not dependent	49.3		131
Fully dependent	69.0	< 0.013*	35
Partially dependent	56.9		144
Living arrangements			
Living alone	83.3		24
Living with spouse/Son/ Daughter	67.1	< 0.000**	79
Living with Spouse and unmarried son	60.5		38
Living with spouse and married son	42.0		
Social adjustment Score			
Good	44.0	< 0.020*	84
Bad	57.5		226
Social networks			
Yes	52.7	< 0.012*	114
No	60.9		196
Total	**54.0**		**310**

**significant at 5 per cent level; ** significant at 1 percent level; ® Reference group*

Elderly who are dependent on others are facing abuse and those elderly having low social adjustment score and are isolated i.e. not having any social contacts are the most abused.

7.7.2 Main perpetrators of elderly abuse

Table 7.2 shows the main perpetrators of elderly abuse. The caregiver who was abusing the elderly most was daughter-in-law (32%) followed by son (24%).

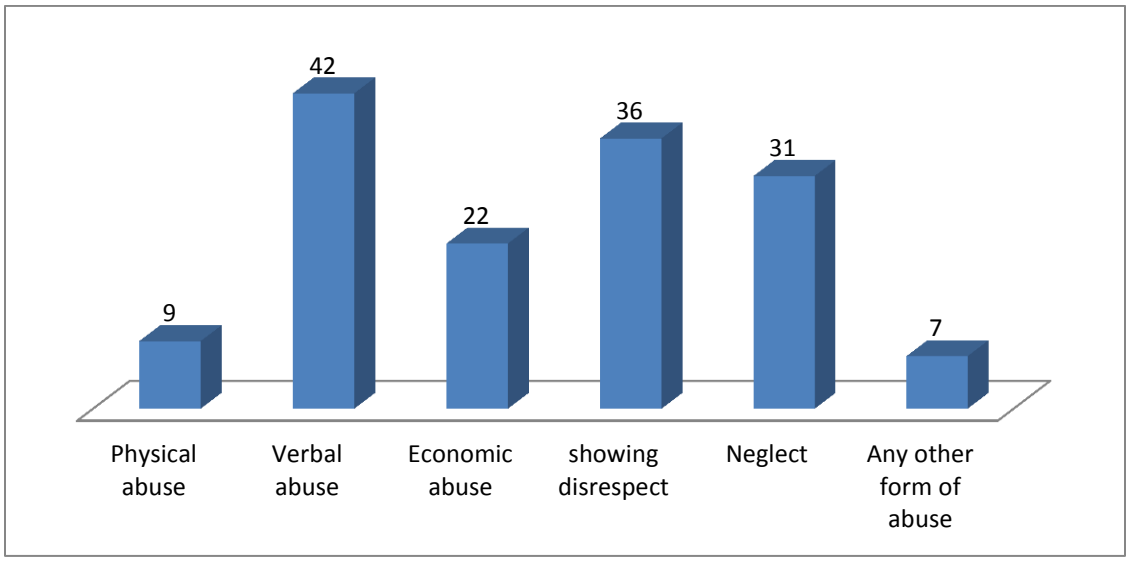
Table 7.2 Main perpetrator of elderly abuse

Perpetrators	%
Son	24.0
Son-in-law	17.0
Daughter in law	32.0
Grand children	16.0
Relatives	5.0
N	**167**

7.7.3 Types of abuse faced by the elderly

Figure 7.3 shows the type of abuse faced by the elderly. Verbal abuse was the most common abuse followed by showing disrespect and neglect. Physical abuse was the least prevalent abuse in the rural settings.

Figure 7.3 Types of elderly abuse



7.8 Association between elderly abuse, morbidity and disability

Table 7.3 shows the association of abuse with any morbidity and disability.

Table 7.3 Interrelationships between elderly abuse, morbidity and disability

	Any morbidity (%)	ρ – Value	Physical Disability (%)	ρ – Value
Abused	94.6	<0.001	73.1	<0.001
Not Abused	72.5		57.8	

The occurrences of morbidities were higher among abused elderly than who were not abused. The abused elderly are more disabled than those who are not abused. Elderly abuse in any form leads to a stressful life.

7.9 Multivariate logistic regression analysis

Table 7.4 shows various models used for logistic regression. These models assess the adjusted effect of elderly abuse on morbidity and disability. Model 1 consists of single variable elderly abuse; model 2 consists of elderly abuse along with social adjustments and social support. The final model 3 has covariates such as elderly abuse, social adjustments and various other socio demographic characters (age, gender, marital status, social support, education, wealth index, caste, state of economic dependence and living arrangements).

Table 7.4 Models design for logistic regression

Models	Model 1	Model 2	Model 3
Variables	• Elderly Abuse	• Elderly Abuse • Social Adjustments • Social Support	• Elderly Abuse • Social Adjustments • Age • Gender • Marital Status • Social Support • Education • Wealth Index • Caste • State of economic dependence • Living arrangements

7.9.1 Adjusted effect of elderly abuse on morbidity

In table 7.5 we have seen the effect of elderly abuse on morbidity. Results of model 3 show that elderly abuse is significantly associated with morbidity. The elderly who are abused are about 8.3 times more prone to morbidity than those who are not abused. Elderly having bad social adjustment score are 4.8 times more prone to any morbidity than those who had good social adjustment score. Elderly having low social network are three times experiencing more morbidity than those having better social networks.

7.9.2 Adjusted effect of elderly abuse on disability

In table 7.6 we have estimated the adjusted effect of elderly abuse on disability. Results from model 3 reveals that elderly abuse is significantly associated with the disability status of the elderly. Abused elderly are 4 times more prone to disability than those who are not abused. Elderly having bad social adjustment score are 3.8 times more prone to disability than those who had good social adjustment score. Elderly having low social networks are 2 times more prone to disability. Elderly lying in the age group of 75+ years are about 3.5 times more prone to disability as compared to the elderly in the age group of 60-65 years

Table 7.5 Results of logistic regression analysis showing factors associated with any morbidity

Variables	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)
Elderly Abuse			
Not Abused®	1.00	1.00	1.00
Abused	3.719**	3.162**	8.359**
Social Adjustment Score			
Good Social Adjustment Score®		1.00	1.00
Bad Social Adjustment Score		3.311**	4.895**
Social Network			
Having Social network®		1.00	1.00
Not having Social Network		2.03*	3.56*
Age			
60-65 Years®			1.00
65-70 years			1.484
70-75 years			4.233
75+years			10.716**
Gender			
Female®			1.00
Male			0.441
Marital status			
Currently married®			1.00
Widowed/ Divorced or Separated			0.429
Wealth Index			
Poorest®			1.00
Poorer			1.694
Middle			2.813
Richer			1.788
Richest			4.274
Education			
No formal education®			1.00
Less than primary			1.088
Primary school completed			1.792
Secondary school and above			3.469
Caste			
General®			1.00
Scheduled Caste/ Scheduled Tribe			0.270
Other Backward Caste			1.171
State of Economic independence			
Not depending®			1.00
Fully dependent			4.069*
Partially dependent			0.072
Living arrangement			
Living alone®			1.00
Living with spouse or son or daughter			1.947
Living with Spouse and unmarried			1.864
Living with Spouse and married son			3.786

**significant at 5 per cent level; ** significant at 1 percent level; ® Reference group*

Table 7.6 Results of logistic regression analysis showing factors associated with physical disability

Variables	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)
Elderly Abuse			
Not Abused®	1.00	1.00	1.00
Abused	1.586**	2.154**	4.182**
Social Adjustment Score			
Good Social Adjustment Score®		1.00	1.00
Bad Social Adjustment Score		2.742**	3.852**
Social Network			
High Social Network®		1.00	1.00
Low Social Network		1.824*	2.427*
Age			
60-65 Years®			1.00
65-70 years			1.564
70-75 years			2.233
75+years			3.545**
Gender			
Female®			1.00
Male			1.513
Marital status			
Currently married®			1.00
Widowed/ Divorced or Separated			1.311
Wealth Index			
Poorest®			1.00
Poorer			1.290
Middle			1.462
Richer			1.150
Richest			1.562
Education			
No formal education®			1.00
Less than primary			1.617
Primary school completed			1.088
Secondary school and above			1.105
Caste			
General®			1.00
Scheduled Caste/ Scheduled Tribe			2.150**
Other Backward Caste			1.370
State of Economic independence			
Not depending®			1.00
Fully dependent			1.238
Partially dependent			1.115
Living arrangement			
Living alone®			1.00
Living with spouse or son or daughter			1.238
Living with Spouse and unmarried			1.086
Living with Spouse and married son			1.671

. **significant at 5 per cent level; ** significant at 1 percent level; ® Reference group*

7.10 Discussion and conclusions

Elderly abuse is a detrimental experience that is significantly associated with theirmorbidity and disability status. Results of the analysis suggest that abused elderly are more prone to frequent episodes of morbidity than their counterparts. Elderly females are more abused as they are fully dependent on their spouse or sons. A study reveals that that elderly in the age group of 70 and above, females and those who are illiterate are the most abused. (Cooney, 2006; Howard & Lawlor, 2006; Leitsch & Waite, 2008). Studies done in various countries like United States of America, the United Kingdom and Japan, have concluded that females are more prone to abuse as they live longer with chronic impairments compared to men (Shibusawa et al.,2005; McFerran, 2009). Elderly females suffering from dementia are more prone to abuse (Natan et al., 2010). The elderly in the age group of 65-70 years are most abused (Dong, 2009). Elderly who belong to lower wealth quintile are more prone to abuse (Day, 2007).

Various types of abuse such as verbal and psychological are associated with depression and anxiety among the elderly (Baker et al., 2009; Begle et al., 2011). A study in Chennai, India on elderly found out that verbal abuse was the most common abuse among the elderly followed by neglect and financial abuse. Females experienced verbal and physical abuse the most compared to men. Daughters-in-law, spouses, and sons-in-law were the prominent perpetrators of elderly abuse (Chokkanathan, 2008).

The major health hazards due to verbal or emotional abuse were digestive problems, bone and joint pain, depression high blood pressure and various other cardiovascular diseases leading to the increase risk of various other co morbidities (Fisheret al., 2011; Fisher & Regan, 2006). Verbal abuse was associated with psychological distress and depression (Kim et al., 2005; Cooper et al., 2006). This in turn affects their physical and mental health, as the literature suggests that elder abuse is associated with an increased risk of premature morbidity, disability and mortality (Dong, 2005, Dong et al., 2009).

Emotional abuse and neglect is also notably associated with higher levels of psychological distress than physical abuse (Pico-Alfonso et al., 2006). Our results also show that percentage of abuse is less for the elderly who are having good social adjustment score and social networks. The concepts of social network and social

adjustments are mediating constructs towards well-being and positively influences the health outcomes (Melchiorre et al., 2013).

Though elderly abuse is a persistent public health and human right issue, yet there are major gaps in awareness drives regarding the education, training and research on elder abuse. Elderly abuse has adverse effects on the physical, mental and social health of individual. Abuse may exacerbate the existing health condition of elderly making their life at anguish. Abused elderly use more health care services. Just knowing the adverse effect of elderly abuse on health is not enough. To control it we need proper interdisciplinary collaborations between health care professionals, social groups, law enforcement agencies who can synergistically work toward effective screening, prevention and treatment of abused elderly. Finally, a coordinated public-private partnership (PPP) needs to be built which can provide relevant services to the abused elderly.

CHAPTER VIII

CORRELATES OF LIFE SATISFACTION

8.1 Introduction

This chapter provides an overview of Life satisfaction (LS) among the elderly. The concept of LS was proposed by Neugarten in 1961. LS is the way a person evaluates his or her lifein context of the socio-cultural and value systems in which they live. It also comprises of some set of relations in the form of expectations and standards (Skevington et al., 2004, WHO, 2011). As ageing is a growing phenomenon worldwide, so lot of research is the area of gerontology is focusing on the concept of 'successful aging'. It is related to healthy ways of getting old that could minimize the effects of pathological aging. As per Life Satisfaction Index (LSI), successful ageing depends upon the general feelings of well–being among older people and it positively contributes into the LS. Three main dimensions of successful ageing are: psychological, social and physical functioning (Reig, 2003; Cabanero et al., 2004). These three dimensions determine LS among elderly. Though much research is done to explain LS among elderly still some inconsistencies exist in terms of the role and relative importance of the predictive variables which plays an important role in LS among elderly.

LSis a subjective indicator of well-being among the elderly, and is related to health and mortality (Stalbrand et al., 2007). Personality traits are also important for LS in old age. The Selectivity Optimization Compensation (SOC) theory explains how LS is related to successful coping with age. The Socio- emotional selectivity theory explores the relationship of LS and social networks in old age (Berg et al., 2009). Along with various socio-demographic variables like age, gender, and income, other covariates like social network and social adjustment also play an important role in LS (Ferring et al., 2004; Beyaztas et al., 2012). The psychosocial variables which are strongly related with LS among elderly are social adjustments and social networks (Krause et al., 1992; Antonucci et al., 1996).

Important factors affecting LS are: individual's morbidity status, state of economic dependence, various environmental factors and social networks. LS among elderly is

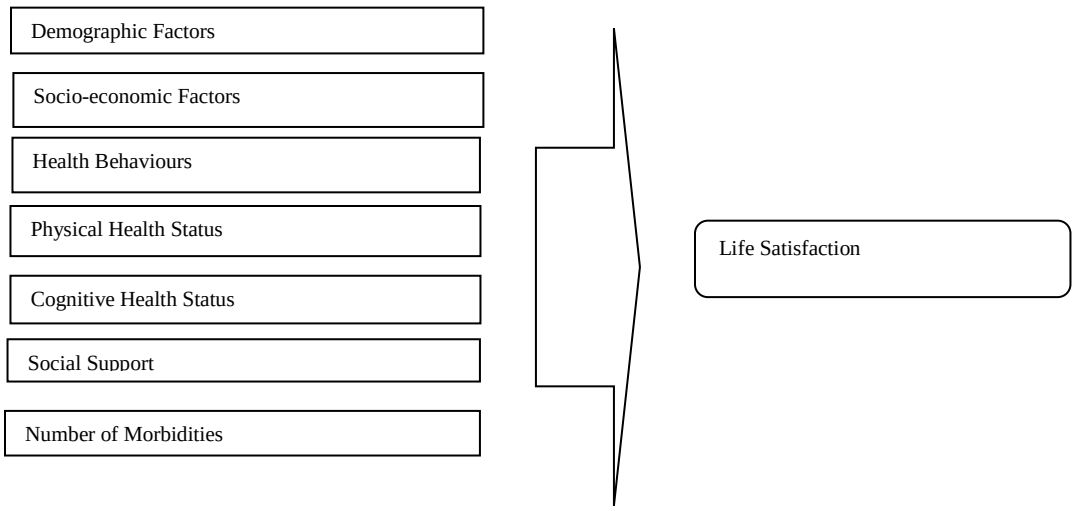
closely related with their active social life, good social adjustment (Dapaah, & Juan, 2014).

Thus there are number of variables which can influence LS among elderly but at times the obtained results may vary. There is an immediate need to address the concept of LS in the context of developing countries like India, as there is not enough research in the area of LS among the rural elderly. So the aim of this chapter is to analyze the factors constructing LS among the rural elderly and explores its implications on their health and life, which can positively contribute in developing some social policies for the elderly.

8.2 Framework of the study

In order to investigate various factors associated with LS among elderly, conceptual framework has been partially derived from Coke and Twaite (1995) and Neugarten et al. (1961) models. As discussed in literature the concept of LS is associated with various factors like demographic, socio-economic, health behavior, physical health status, cognitive health, social support and number of morbidities among elderly**.** We have recorded responses on these above mention aspects by asking questions through a structured questionnaire from the respondents. The framework of the study is summarized in Figure 8.1.

Figure 8.1Framework of this study model by (Coke and Twaite, Naugarten et al.)



8.3 Methodology

8.3.1 Variables under study

Variables used for the study (both dependent and independent) has been explained below.

Dependent variables: In this chapter we have taken LS as our dependent variable. In order to determine LS, respondents were asked, "Taking all things together, how would you say you are these days"? The responses were on Likert scale ranging from (1.very happy, 2.happy, 3. neither happy nor unhappy, 4. unhappy and 5. very unhappy.

Independent variables: The independent variables are; a) Age (reference group: 65+ years), b) Marital status (reference group: Not currently married), c) Caste (reference group: SC/ST/ general), d) Education(Likert scale) e) Wealth quintile (Likert scale), f) state of economic independence (reference group: dependent), g) living arrangements (reference group :living alone), h) Risk behaviors (reference group: consuming tobacco, smoking, and drinking alcohol i) disability status (reference group: not disabled), j) Functionality or ADL (reference group: functional), (k) cognitive health status (reference group: bad cognitive health, l) social networks (reference group: not having good social networks), m) morbidity status (reference group: no morbidity).We tested multi-co linearity for all independent variables, and in no case was the tolerance value less than 0.1 or the variance inflation factor (IVF) greater than 10.

8.3.2 Statistical analysis

Analysis was conducted as follows: hierarchal multiple regression analysis was carried out by gender. We have used hierarchal regression in our model by gender because according to literature gender as a factor plays an important role in the LS among elderly. Literature on differences in pain responsiveness indicates towards gender variations, where women generally have an increased sensitivity to experimental pain in comparison to men. Moreover the perception, attitude and approach towards life are very different among both the genders.

Level of LS is lower among those men who are living alone or without their spouse while among females, LS is lower when they used to stay with their relatives or their parents-in-law. Similarly co-residence with an unmarried son is negatively associated with LS for

both men and women (Oshio, 2012). Larger number of friends and social activities enhance LS for women but not for men (Humpert, S. 2013).

Figure 8.2 and 8.3 shows the normal P-P plot of regression standardized residual and scatter plot, which indicates the outliers, normality, linearity and homoscedasticity. The purpose of P-P plots is to check if the data are normally distributed so here the data are plotted against a theoretical normal distribution in such a way that the points should form an approximate straight line. Departures from this straight line indicate departures from normality. Here the normal P-P plot points are lying in the straight diagonal line from the bottom left to top right showing normal distribution of data and fit for analysis. In scatter plot, residuals are rectangularlly distributed with most the scores concentrated at the centre i.e. along the point O. Standardized residuals of more than 3.3 or less than -3.3 indicates outliers (Tabachnick & fidell,2007).

Figure 8.2 Normal P-P Plot of regression standardized residual of LS

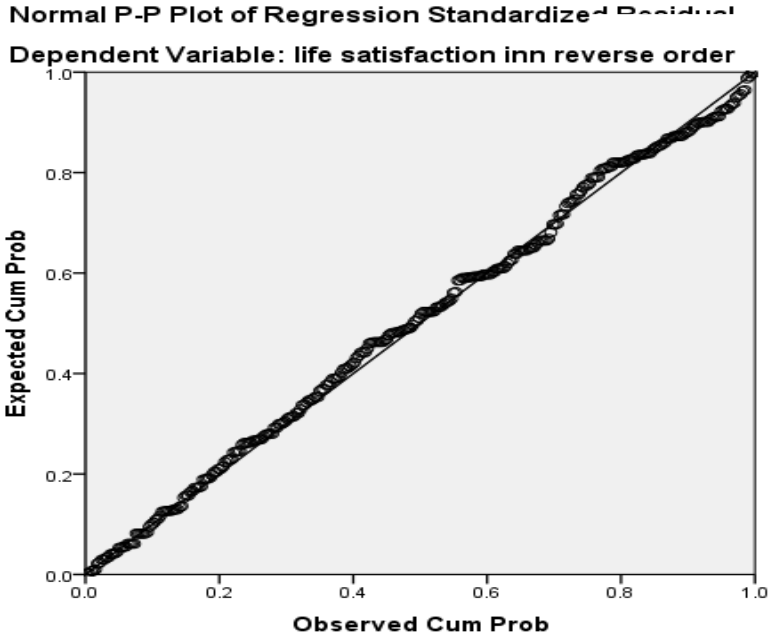
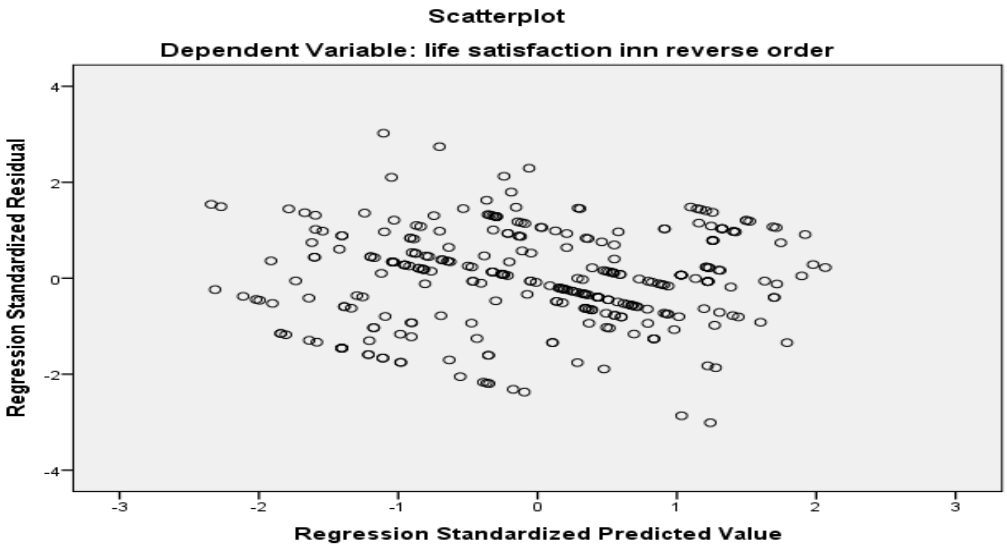


Figure 8.3 Scatter plot of LS among elderly population



The table 8.1 given below shows the model summary of both dependent and independent variables. It shows R^2value and variables entered in Block one (age, caste, marital status, education, wealth index, state of economic dependence, living arrangements, life style indicators, activities of daily living, cognitive health and social adjustment,) they together explain 30% of the variance (.30*100) in dependent variable (DV). After entering the variable gender in block two the model now explains 35% of variance in the DV. The R^2change in model two here again explains an additional of 5% variance in DV by variable gender. This is a significant contribution, as indicated by *sig.F* change value for this line (0.000).

Table 8.1Model summary of LS

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.552[a]	.304	.266	3.498	.304	8.014	16	293	.000
2	.583[b]	.350	.302	3.513	.086	15.796	1	292	.000

a* predictors: (constant) age, caste, marital status, education, wealth index, state of economic dependence, living arrangements, life style indicators, activities of daily living, cognitive health and social adjustment.
b* predictors: (constant) age, caste, marital status, education, wealth index, state of economic dependence, living arrangements, life style indicators, activities of daily living, cognitive health and social adjustment, gender.
c* dependent variable : life satisfaction.

This method is appropriate for this study, in that the effects and coefficient values of each factor on LS and amount of change (increase/decrease) in the R^2value are provided in

comparable forms. Table 8.2represents all the five models considered for analysis in which variables are added in each model and the final model contains all the 13 variables used in the analysis. Outliers, normality, linearity and homoscedasticity are basic principal assumption which justifies the use of linear regression models for purposes of inference or prediction these are needed to be checked before we run any model .In our case all the results were within the presumable limit to carry the analysis forward.

Table 8.2Model design for regression analysis

Models	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Variables	**Only demographic variables** • Age • Marital status	**Only Socio-economic variables** • Education • Wealth Index • Caste	**Only life style indicators** • State of economic dependence • Living arrangements • Risk behaviour (Smoking, Consuming tobacco and alcohol)	**All independent covariates** • ADL(activities of daily living) • Social networks	**All independent covariates** • Age • Marital status • Education • Wealth quintile • Caste • State of economic dependence • Living arrangement • Risk behaviour (Smoking, Consuming tobacco and alcohol) • ADL(activities of daily living) • Social networks • Disability • Cognitive health • Morbidity status

8.4 Results

In order to identify the factors which determine LS in elderly individuals, we conducted a hierarchical regression analysis with respect to gender (Table 8.3 and 8.4). Five sets of models were introduced and the result of final model is presented after the introduction of 13 variables. Results shows that 6 variables were statistically significant for both men (adj. R^2=0.384) and women (adj. R^2=0.386).

The most important factor that was influencing LS for both males and females are: individual's cognitive health,(β value; M=0.327, F=0.329);social network (β value; M=0.286, F=0.284); living arrangements (β value; M=0.179, F=0.178); disability (βvalue; M=-0.479, F= -0.476); ADL or functionality (β value; M= -0.286, F= -0.284) and, morbidity status (β value; M= -0.077, F= -0.074).

The differences in the results observed in men and women can be summarized as follows: In model V there has been highest increase in the explanatory power of the R^2 value in terms of LS for both men and women. We have further added variable like disability, cognitive health and number of morbidities in model V due to the explanatory power of R^2 was measured at 0.140 in both male and female. Next largest increase of explanatory power of $R^2$was observed in model IV where the change in adjusted R^2 value increased to 0.089 in men and 0.087 in women. In this model, the variables introduced were ADL and social network.

Table 8.3Model design for multiple liner regression for LS for males

Variables	Model I	Model II	Model III	Model IV	Model V
Age of the respondents[+]	0.003	0.005	0.004	0.015	0.019
Marital status[+]	0.936	0.084	0.007	0.004	-0.023
Education[§]		-0.02	-0.032	-0.007	-0.008
Wealth quintile[§]		0.196	0.136	0.125	0.069
Caste[+]		0.009	-0.023	-0.053	0.052
State of economic dependence[+]			0.044	0.044	0.074
Living arrangements[+]			0.165**	0.161	0.179
Risk behaviours					
a) Smoking[+]			0.029	0.061	0.102
b) Consumption of alcohol[+]			0.3	0.28	0.357
c) Consuming tobacco[+]			0.109	0.162	0.168
Activities of daily living(ADL) [+]				-0.546*	-0.287*
Social networks[+]				0.192**	0.286**
Disability[+]					-0.479**
Cognitive health[+]					0.327*
Morbidity status[+]					-0.077
Adjusted R^2	0.002	0.116	0.155	0.244	0.384
Change in Adjusted R^2		0.114	0.039	0.089	0.140

** ρ <0.05;* ρ <0.01
Dependent Variable: Likert scale (1.very happy, 2.happy, 3. neither happy nor unhappy, 4. unhappy, and 5. very unhappy.
The suggested figures in all cells are standardized B.
[§]Continous variables: 5-point Likert scale
[+]Binary variables

Table 8.4Model design for multiple liner regression for LS for females

Variables	Model I	Model II	Model III	Model IV	Model V
Age of the respondents[+]	0.002	0.005	0.005	0.016	0.02
Marital status[+]	0.905	0.091	0.067	-0.003	-0.031
Education[§]		-0.026	-0.025	-0.001	-0.002
Wealth quintile[§]		0.196	0.136	0.125	0.068
Caste[+]		0.008	-0.02	-0.051	0.054
State of economic dependence[+]			0.041	0.041	0.072
Living arrangements[+]			0.164**	0.16*	0.178
Risk Behaviours					
a) Smoking[+]			0.025	0.057	0.098
b) Consumption of alcohol[+]			0.283	0.264	0.342
c) Consuming tobacco[+]			0.109	0.162	0.17
Activities of daily living(ADL) [+]				-0.548**	-0.288*
Social networks[+]				0.189*	0.284**
Disability[+]					-0.476*
Cognitive health[+]					0.329**
Morbidity status[+]					-0.074
Adjusted R^2	0.004	0.119	0.159	0.246	0.386
Change in Adjusted R^2		0.115	0.040	0.087	0.140

** $\rho < 0.05$;* $\rho < 0.01$
Dependent Variable: Likert scale (1.very happy, 2.happy, 3. neither happy nor unhappy, 4. unhappy, and 5. very unhappy.
The suggested figures in all cells are standardized B.
[§]Continous variables: 5-point Likert scale
[+]Binary variables

8.5 Discussion and conclusions

This chapter provides an overview of the correlates of LS among the elderly population. It is also observed that negative life events may increase psychological distress among elderly people and in turn can lower the level of LS. However there is a direct relationship between social networks and LS, as social network increases LS also increases. Disability has also a significant effect on the LS of elderly people. Furthermore, disability, preceding psychological distress, lack of friend circle or social network system that could help elderly, low ADL and IADL scores was associated with dissatisfaction with life or lower level of LS (Helvik et al., 2011;Nguyen et al., 2013).

LS and mental health are associated with some specific demographic factors such as age and gender. In addition, self-rated health and limited functionality due to disability exert a significant impact on psychological well-being and can lead to depressive symptoms, and psychological distress. The relationship between ADL, psychological factors and LS was different between males and females. It is a well-established fact that with increasing age, there are higher likelihood of morbidity and disability. This may be due to the nature or occurrence of disease as older people do not encounter with fatal diseases rather they suffer from chronic diseases (Nguyen et al., 2013; Sato et al., 2002).

The LS of the elderly population relies on factors such as living arrangement, health condition, economic status, social support and financial status of their children. In case if the elderly people are having similar mind set as of their children, they can enjoy a healthier and happier life span with them. Moreover if they have enough financial resources to meet their basic needs and have adequate social support then they have higher LS. Living alone results into lower LS than those elderly who are living with spouse or their children (Cook, 2010; Chen et al., 2010; Kooshiar et al., 2012).

Our results conclude that most important variables which affect the level of LS of the rural elderly are cognitive health status. In this study, majority of the sampled elderly (50%) were recorded with bad cognitive health. Elderly having low GHQ -12 score are prone to depression leading to lower LS (Won &Choi, 2013). The second most influential factor on LS is social network. Many studies have reported that social activities or interpersonal relationship enhances both physical and mental health. It lowers mortality rates among elderly (Fisher, & Baum, 2000). Social networks improves one's self esteem, sense of belongingness and gives a purpose to life. It also provides physiological benefits such as better immune functioning and increased cardiovascular activities. It also promotes positive health behaviors like proper diet, exercise and helps a person to stay away from risky behaviors' such as smoking and consumption of alcohol (Brissette, & Seeman, 2000; Glass et al., 1999).However the degree of social networks varies with the disability and morbidity status of an individual (Pinto & Neri. 2013).The next important factor effecting LS among rural elderly was morbidity status. There was an inverse relationship between the morbidity status of a person and his LS. Good health allows the

person to maintain social contacts, resulting in higher level of LS and prevalence of chronic diseases results into low level of LS. Low LS is associated with ADL and IADL which is necessary for overall quality of life (QoL).Chronic conditions like diabetes, hypertension and cardiovascular diseases have adverse effect on the health and it's harmful for both cognitive and physical disabilities (Leon et al., 2010). The other important variable for LS for rural elderly was living arrangements. In our study elderly living with spouse and married son was about 55%. Elderly living with family members showed increased LS than those living alone or with relatives. Elderly living alone are unable to meet their basic requirements in case of disability and chronic conditions. Having support from family members reduces the effect of diseases and it gives them will power and strong mental attitude to manage their day to day life (Kim et al., 2014). Living arrangements acts as a powerful instrument in defining roles among elderly as it gives a sense of belongingness and provides social support both formal and informal (Oh et al.,2015). Spouse can be an important support for both male and females as the males can looks after for finances and females take care of health issues (Kooshiar et al., 2012).

In this study, the subjective meaning of ageing is determined on the basis of the LS model. Factors such as cognitive and morbidity status, and social networks can be the areas of concern and special focus for the gerontologist. Interdisciplinary research with the aim of increasing LS in the elderly should be promoted. Management of health conditions and ADL, IADL functioning plays a pivotal role in increasing LS among elderly. This study can contribute positively in the overall feeling of happiness among the elderly population which may become a basis for the formulation of policies to improve the QoL in the county like India.

CHAPTER IX

SUMMARY AND CONCLUSION

9.1 Summary and discussion

This chapter presents the summary of the results, recommendations and scope for future work in the area of gerontology. Promotion of healthy ageing is a key approach to public health policy in many countries, as growth of the elderly population is on the rise. The study was conducted among the rural elderly, in the age group of 60+ years in the Bargarh district of Odisha. More than half of the population was classified under Below Poverty Line (BPL) category. Results suggest that majority of the elderly were living in the Kuccha houses with no separate cooking space. Wood was the most common cooking fuel, followed by LPG and Kerosene. There was lack of proper sanitation facilities and majority of the population was using biomass fuel for cooking. One-third of the world's population burn organic material such as wood, dung or charcoal (biomass fuel) for cooking, heating and lighting. This form of energy usage is associated with high levels of indoor air pollution and an increase in the incidence of respiratory infections, including Pneumonia, Tuberculosis and COPD, low birth weight, Cataracts, Cardiovascular diseases among the population. As a result, a large proportion of population are exposed to high levels of household air pollution which is a major cause of pollution related diseases like COPD (Gregory et al, 2012). The findings have important program and policy implications for countries such as India, where large proportions of the population rely on polluting biomass fuels for cooking and space heating. More epidemiologic research with better measures of smoke exposure and clinical measures of asthma is needed to validate the findings (Mishra, 2005).Present study also indicates that about 60.3% of the respondents had no formal education, followed by those who have completed primary (27.7%). Only 4.5% had completed their secondary school and above. More than half of the elderly had separate room and rest were either sleeping in kitchen or veranda and few also shared rooms with their grandchildren. About one fifth of the elderly were fully dependent on others, out of which majority of them are dependent on their sons.

The overall prevalence of multi-morbidity was about 57% among rural elderly in Bargarh district. The occurrence of multi-morbidity was higher for male elderly compared to female. Our study suggests that the major diseases among the elderly population residing in the rural areas of Bargarh district were Arthritis, COPD, High blood pressure and cataract. A study in Dehradun in India also reveals similar results chronic conditions like High blood pressure and COPD were quite high amongst the elderly population (Kandpal, 2013). Our findings show that multimorbdity is significantly associated with risk behavior, age and state of economic dependence. A study conducted in USA shows that multimorbdity status among the elderly increases steeply with age, social group and religious affiliation (Sauver et al., 2015). Our results indicate that lifestyle factors are significantly associated with multi-morbidity among the elderly population. We have investigated the relationship between lifestyle indicators and the co-occurrence of multiple chronic diseases. The role of education was negligible in determining the level of multi-morbidity. Elderly belonging to OBC were more prone to multi-morbidity as compared to General Caste and SC / ST elderly. Elderly who were dependent on others were more prone to multi-morbidity. Results from the multivariate analysis showed that age, state of economic independence and life style indicators were the most important measured predictors of multi-morbidity.

Results indicate that males reported higher level of physical and ADL disability than females. However the prevalence of IADL disability was higher among the females in comparison to males. Our findings reveal that the most common physical disability among the elderly was related with the visual impairment followed by locomotive disability. The rate of disability among the males was higher than their female counterparts (Andrade, 2009). Morbidity status was significantly associated with all types of disabilities whether its physical or psychological (Jagger et al. 2007). Global evidences indicates towards the fact that generally 90% of the expected disability results from NCDs among the developed countries while among the developing nations like India where almost half of the expected disability results from communicable diseases and injuries (Murray and Lopez 1997). Severe disability is associated with higher rates of mortality among both men and women. Results also show that there is a positive association between number of morbidities and various types of disabilities and

psychological distress. Those elderly who experiences frequent episodes of morbidity are more prone to physical and IADL disability.

Healthcare utilization and financing pattern indicates that the elderly were seeking treatment (outpatient) mainly for the diseases such as high Blood Pressure, Fever, Stomach infection, Injury due to fall, Typhoid and others (Malaria and Acidity). For inpatient services, utilization was higher among the elderly for the treatment of ailments such as Asthma, COPD, Injury due to fall, Urinary tract infection and others.Main source of treatment were government hospitals, which may be due to lack of finance and/or easy availability of the facility. Main financers for the healthcare needs among the elderly population for the inpatient care were: son, spouse, daughter and son/daughter-in-law. Similarly, for the outpatient care also, the main financers were: son followed by contributions from spouse and son/daughter in-law.Higher prevalence of the diseases among the elderly population makes them more vulnerable to healthcare spending. If the elderly were working or they have savings or sufficient bank balance then in that case they spend more on the health care. As it is evident that lack of money or savings are the main cause of lower spending on healthcare, so savings acts as a precautionary motive (Keynes,1936). Precautionary savings helps the elderly households to meet the contingency requirement and unforeseen and adverse health outcomes. Holding bank balance or money helps the elderly to avoid the uncertainties in healthcare expenditure. As the age increases the functional decline sets in and causes disability and non-functionality among the elderly. In addition multi-morbidity makes the elderly highly dependent on their caregivers for financing their long term healthcare needs. Majority of the studies on elderly healthcare shows that multi- morbidity was a strong predictor of higher healthcare utilization rates and healthcare costs (Lehnert et al., 2011).As age increases there is a greater need for financing as elderly at the later age faces chronic health issues but due to dependence on their caregivers much attention is not paid to their healthcare needs. They are facing double burden of financing as they don't have enough money and also they are more prone to multi-morbidity.

More than half of the elderly were prone to any type of abuse. The elderly in the age group of 65-70 years, females, widowed/divorced or separated, having low level of education, poor economic status, fully dependent on others, living alone, and having bad

social adjustment score were facing higher incidences of abuse. Elderly who have good social network were less prone to abuse. Our results indicate that abused elderly are more prone to multi-morbidity and disability. The prevalence of disability is higher among abused elderly. As social network and social adjustment buffer the effect of elderly abuse the government should collaborate with formal and informal sectors to improve social network and social adjustments among the elderly which can improve their situation and reduce their exposure to abuse (Fisher et al., 2011). Financial abuse is most common among illiterate elderly (Gorbien & Elsenstein, 2005). A study in rural Bangladesh reveled that various socio demographic factors have significant effect on elderly abuse such as females, living alone, unmarried/separated/widowed, living arrangements, poverty and illiteracy (Mansur et al., 2013).

This study presents that the most important factor that was influencing LS for both genders were: individual's cognitive health, social network, living arrangement, disability, ADL or functionality and, morbidity status. Elderly who had low GHQ-12 score were having low LS. Social network is very helpful for the elderly as it provides emotional support and enhances positive thoughts. Positive thoughts help manage themselves well in conditions of stress. Living arrangement was also an important predictor of LS. Elderly who live alone have regular health problems and they mostly neglect themselves which makes their condition worse thus elderly living alone have low LS. Disability status was also another important predictor of LS among the elderly. Those elderly who have any sort of disability have lower LS as disability sprouts negative thoughts leading to low GHQ score which affect LS.

The high prevalence of morbidity observed in our study suggests that there is an urgent need to develop geriatric health care services in the developing country like India. Most of the developing countries like India are least prepared to meet the challenges of societies with rapid increase in ageing population (WHO, 2004). The WHO has recently taken initiatives towards elderly-friendly primary healthcare and has developed 'Age-Friendly Primary Health Care Centers Toolkit' aiming at improving the primary healthcare responses to older persons. Sensitizing and educating primary healthcare workers regarding specific needs of the elderly clients, and providing guidance on how to make primary healthcare-management procedures more responsive to the needs of elderly

(WHO, 2008).More studies are required to provide a clear picture of the morbidity conditions and their association with disabilities among the elderly in Odisha. This will further lead to a substantial increase in the delivery of care to those elderly who need it most. Wellness and disability status play a major role in determining the health and wellbeing of the society in general and elderly population in particular.

9.2 Conclusions

Studies around the world have highlighted that there is a significant positive relationship between health and subjective well-being. The results of this thesis also reports similar findings for the elderly population residing in Bargarh district of Odisha. In this study overall subjective wellbeing among the elderly population was assessed on the basis of the morbidity and disability condition, prevalence of multi-morbidity, socio economic inequalities, association of morbidity status with the elderly's psychological well-being and disability, association of elderly abuse on morbidity and disability and various covariates of LS among the elderly.

With the advancements in the healthcare services the life expectancy has increased tremendously (ORGI and Census Commissioner 2006). Increase in the longevity of life has been also accompanied by increase in the economic insecurity, decrease in family support and decline in the mortality. With the increase in the age of elderly people they are more prone to frequent diseases as a result episodes of morbidity also increases and brings economic insecurity as they do not have any permanent source of income.

More than half of the elderly population is suffering from multi-morbidity and the frequency of diseases was higher among the males. Life style indicators had a significant impact on multi-morbidity even after controlling covariates like age, state of economic independence and living arrangement. There should be awareness campaign in the villages about the negative consequences of smoking and chewing of tobacco with the help of local NGOs and panchayats.

Morbidity is positively associated with disability and psychological distress, which can make the life of elderly worse. However, IADL does not maintain trajectory with the number of morbidities as compared to ADL and physical disability. It can be concluded that though people have problems with their IADL activities they are not aware of it, and hence it goes unnoticed and unrecognized. These ignored conditions will later prove to be

detrimental for their overall health. It is the role of health care providers to identifying the cases and provides timely intervention and free medical check-up, especially for IADL, which will delay the onset of disability. Once both the morbidity and disability status of the elderly is determined, their financing needs and health care utilization patterns can be examined.

Age, savings, risk behaviour, functionality and multi-morbidity have shown a significant impact on OOPE. As age increases, there is a greater need for financing due to severity of illness, but due to dependence on their caregivers much attention is not paid to the healthcare needs of the elderly population. They are facing double burden of financing, as they don't have enough money and also are more prone to multi-morbidity. Risk behavior is also influencing the OOPE as it leads to morbidity which further increases OOPE in the elderly. The burden of multi-morbidity was higher among the elderly population due to which they have higher level of OOPE. The OOPE can be catastrophic for them and pushes them towards impoverishment leading to poverty. So here the role of policy makers comes in where they have to launch schemes targeting elderly who belong to BPL category. There is need to further increase the provision of the public health facilities for the elderly population. The existing pension schemes need to be revised, promotion of PPP of healthcare providers in rural areas must be encouraged. Though there are some social benefit and pension schemes, which are available for elderly like old age pension schemes, tax concessions and special laws enacted for the elderly population, very low priority has been given for providing geriatric care and other health needs of elderly.

Age, state of economic dependence and life style indicators are the most important measured predictors of multi-morbidity among the rural elderly. Our findings indicate that elderly abuse was very common in the rural community and it leads towards morbidity and disability. The prevention of elderly abuse may be done by increasing community awareness about elderly abuse through accessible, relevant and timely information. Empowerment of the rural elderly can be done by increasing awareness about their legal, financial and societal rights. Active engagement by health care professionals and social workers who can identify abuse easily and respond to it at the earliest may solve the issue quickly.

LS were associated with various socio-economic and demographic factors including physical, cognitive health and social networks. This study can contribute positively in the overall SWB the elderly population which may become a basis for the formulation of policies to improve the quality of life in a county like India. Consequently, a multi-dimensional approach is required to address the issues of health inequalities and overall SWB among the elderly at Odisha.

9.3 Contribution of the research work

The contributions of this thesis in light of above summary and findings have been discussed as follows:

- Majority of the elderly are unemployed and are unable to pay for the regular health care expenses. Twin challenge is faced by the elderly population to cater their healthcare needs one; higher burden of morbidity and disability and second; to be actively involved in the workforce to manage their financing needs (Smith et al., 2012). Even if the insurance schemes are available to the elderly population they are not that useful as they are unable to cover the outpatient or drug purchase expenses (Shahrawat and Rao, 2011), and, thus, even insured elderly have a higher chance of falling into poverty, given that outpatient and drug expenses causes more catastrophic expenditure. The nature of illness is chronic among the elderly which needs more spending in the older age, but as such there is also absence of any financing mechanism which can cater the chronic healthcare needs of the older segment of the population. There are also serious gaps in the availability of the adequate health infrastructure in the rural areas as the rural areas are still not fully connected with the urban centres and special geriatric units are nearly absent.
- There is an immediate need to solve the issues related with the social protection schemes. The social protection schemes should be more sensitive with the health care demands of the elderly population. There should be a balance between the supply and demand side aspects of the healthcare financing. Recently the pension schemes in India in the formal sector have been also abolished which will further complicate the situation. In addition the issues of the public health system, such as

lack of infrastructure, limited manpower, poor quality of care, and overcrowding of facilities are exacerbated for geriatrics due to insufficient focus on elderly care.

- The model of SWB proposed in this study can be looked into which has covered nearly all the aspects related to the overall well-being among the elderly for making policies regarding the healthcare needs of elderly people and how these problems can be minimized. Health care utilization and health care financing policies can also be reframed by keeping in mind the specific needs of the elderly in Odisha.

- Our results suggest that having three or more morbidities is positively associated with all types of disabilities (physical disability, IADL, ADL) and psychological distress. So, special attention should be given to the elderly who are having any sort of morbidity, as it may later result in disability, which can increase the healthcare burden on the society.

- Results suggest that OOPE is substantially higher among the elderly who have multi-morbidity and various types of disability. Moreover, the occurrence of multi-morbidity and disability is higher among elderly who belong to low SES. So, there is an immediate need to reconsider the existing pension schemes to manage the healthcare needs of elderly. Though there are some social benefit schemes and pension schemes, which are available for elderly like old age pension schemes, tax concessions and special laws enacted for the elderly population, but very low priority has been given to provision of geriatric care and other healthcare needs of elderly.

- Elderly abuse is positively related with morbidity and disability. Abused elderly are more prone to physical and cognitive health problems, which later lead to disability. Healthcare professionals, social groups and government should collaborate with each other to address this issue in a broader perspective.

- Elderly abuse harms them physically and mentally, so particular attention should be paid on the instances of abuse. Hospitals should have a geriatric ward where elderly who come for treatment should be taken special care not only for the ailment but also for psychological distress, which they hardly tell anyone due to shame and fear. The ward should have psychologist and social workers who can take care of this issue. A psychological, societal, and economical approach should be followed to handle this issue.

- Our results suggest that LS is positively associated with social networks, elderly who are having good social network are having better LS. Elderly who have good social network can handle stress more easily than those who are not having any social network. Attention should be paid at the societal level to maximize the benefits of social network by enhancing both quantitative (e.g. frequency of contact) and qualitative aspects (e.g. emotional support).

- The results from the analysis show that morbidity pattern among elderly are linked with disability and psychological distress. There is a need for multi-dimensional approach for cure and care of the elderly. This approach should be implemented at a wider scale especially in government hospitals. Proper training should be provided to the medical staff, nurses and social workers to cater the overall healthcare needs of the elderly.

- Our study concludes that the most influential factor for LS among the rural elderly was cognitive health and social network. Health and longevity is affected by social network as it plays an important role in life of elderly. The importance of social network for the well-being of elderly cannot be underestimated. While framing policies for the elderly, special care should be taken to improve their social inclusion such as participation in various activities at the village level.

9.4. Practical implications of the study

Every government hospital in the villages should have Geriatric ward which takes special care of the elderly as their need are different from that of the youth and children. Proper

training should be given to the health care works to deal with the elderly patients as they shy off to tell their problems due to financial constraints. Proper counseling and training sessions should be organized for the healthcare workers to deal with special healthcare needs of the elderly. Elderly who are fully dependent on their care givers are in bad health so the policy setters should encourage free medical checkup for the elderly, basic medicines for NCDs which are most common in this area should be freely available in the government hospital. Health Insurance coverage for the rural people should be encourages as it helps them in the situation of ill health. Though government is having few pension schemes for the elderly but it needs to be revised and the distribution system also has many flaws which also need to be checked.

9.5 Limitations of the study

The following are the limitations of the present study:

- It was a major challenge to explain to the respondents and their family members about the reason behind this study and the underlying benefit to them. Many respondents were curious to know whether they will receive any financial benefit from the government or not. Many respondents were cooperative and enthusiastic, but few were quite reluctant to share their feeling. They strongly closed the door on the face of the researcher at the time of data collection. Few elderly females wanted to share their feelings but were restricted by their sons and daughters-in-laws when they had to respond to the questions on abuse and mistreatment.
- This is a cross sectional study and results may change over time.
- This study takes into consideration only self-reported cases for any sort of morbidity and disability. No clinical examination has been performed, so the results may vary.
- The study is confined to few villages of Bargarh district in Odisha. It can be extended to other districts also to provide a probable solution to the problems faced by elderly that can be useful for the decision makers in future for policy implications.
- Review of literature was conducted section wise which was divided into five sub-sections; however this could have been done in a more systematic manner.

9.6. Scope for future research

Health is the major concern that has a significant impact on the overall SWB among the elderly in the present scenario. Research on elderly health and its relationship with various socio-economic and demographic factors is seen in many studies. But the status of multi-morbidity and its prevalence can also be checked with other variable such as: leisure activities, decision making and nutrition. LS can be checked further with social adjustment score and adjustment inventory. Apart from considering various socio-demographic variables and social adjustment score, issue of abuse can be further addressed with transfer of assets, social contacts and their perception about younger generation. Elderly parent's role in decision making and its impact on LS and overall health can also be re-examined.

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Annexure 1: Dissemination

International journals

1. Banjare P, Pradhan J (2014). Socio-Economic Inequalities in the Prevalence of Multi-morbidity among the Rural Elderly in Bargarh District of Odisha (India).*PLoS One*, 9(6), 1-10.

2. Banjare P., Mahapatra S.S., Debata B. R. (2013). Assessment of demographic and socio-economic factors on ailments and disability among elderly: *Indian Culture and Business Management,* X, No. Y, 40, 1-15

3. Banjare P, Pradhan J (2015). Factors associated with the life satisfaction amongst the rural elderly in Odisha, India. *Health and Quality of Life, BMC*

4. Banjare P, Pradhan J (2015). Concerns and Maintenance during Twilight Years: Expectations vs. Reality in Rural Setup of Odisha, *Journal of Ageing: Research and Clinical Practice*(accepted for publication).

Edited book chapters

1. Banjare P, Pradhan J, (2011). Socio-economic inequalities in self–rated poor health among Indian elderly: Evidence from NSS0 60^{th} round data. In U. V. Somayajulu et al., (Eds), *Health, Poverty and Human Development* (pp. 353-366), ISBN 978-81-89630-24-9, 353-366.

Under publication

1. Relying on whom? Health care Expenditure among Elderly in Bargarh District of Odisha, *Indian Journal of Economic Development*.

Communicated

1. Prevalence of elderly abuse and its association with morbidity: a study in rural Odisha, India, *Journal of Elder Abuse and Neglect, Taylor & Francis publisher.*

2. Correlates of Out of Pocket Health Expenditure in India: A Study of Bargarh District in Odisha. *Journal of Rural Health, Wiley publisher.*

Annexure 2: Survey Questionnaire

Confidential for Research Purpose Only

SOCIO-ECONOMIC INEQUALITY IN HEALTH AND HEALTH CARE UTILIZATION AMONG RURAL ELDERLY: A CASE STUDY OF BARGARH DISTRICT OF ORISSA.

Department of Humanities and Social Sciences

National Institute of Technology, Rourkela-769008

Orissa

My name is……., I am doing research at National Institute Technology Rourkela, Orissa. As part of the research work, we are interviewing the elderly people those who are living in rural area in Orissa. The study aims to explore the, familial setups, roles, health status and expectations of the elderly.

Confidentiality and Consent:

I am going to ask you some personal questions that some of the people find difficult to answer. Your answers are completely confidential, your name, will not be disclosed to anyone, and will never be used in connection with any of the information you tell me. You do not have to answer any questions that you do not feel comfortable, and you may withdraw from this interview at any time you want to. However, your answers to these questions will help us to understand the senior citizens situation. We would greatly appreciate your help in responding to this interview. Would you be willing to participate?

IDENTIFICATION:

SCHEDULE NUMBER: _____ | | | | |

NAME OF VILLAGE: _____

NAME OF HEAD OF THE HOUSHOLD: _____

ADDRESS OF HOUSEHOLD: _____

QUESTIONNAIRE

SECTION I

Line no.	Usual residents Name	Relationship To Head of Household	Sex M=1 F=2	Age	Marital Status	Educational Attainment (For age 6 years and above)	Is this member currently working 1= yes 2=no If no in col 8 then go to col 10	Type of Work (for those who are working)	Income(per annum)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
01		01	1 2				1 2		
02			1 2				1 2		
03			1 2				1 2		
04			1 2				1 2		
05			1 2				1 2		
06			1 2				1 2		
07			1 2				1 2		
08			1 2				1 2		
09			1 2				1 2		
10			1 2				1 2		

Code for col.3	**Code for col.6**	**Code for col.7**	**Code for col.9**
01= Head	1=currently married	1= No formal education	01 =Farming
02 =Wife/husband	2=Separated	2=Less than primary school	02 = Agri-labour
03=Son/daughter	3=Widowed	3=primary school completed	03 =Govt. servant
04=Son/daughter-in-law	4=Divorced	4= Secondary school completed	04= Private sector
05=Grandchild	5=Never Married	5=High school completed	05= Small business
06=Parent	6.Cohabiting	6=College/Pre-university/university completed	06=Others (specify)
07=Parent-in-law		7=Post graduate degree completed	
08=Brother/sister			
09=Brother or sister-in-law			
10=Other relative			
11=Adopted/foster child			

Total number of elderly living in the household (60+): Male: ☐ Female: ☐ Total: ☐

SECTION II: Housing condition and environment

Q.No.	Questions and filters	Categories and coding	Skip To
200	Line No.	☐☐	
201	Type of family	Single…….. 1 Nuclear …….. 2 Joint ……..…. 3 Extended …… . 4 Others (Specify…… ..)9	
202	What is your religion?	Hindu …….. 1 Muslim ……..…. 2	

Q.No.	Questions and filters	Categories and coding	Skip To
		Christian…… 3 Others(Specify…… ...)9	
203	Which caste you belong to?	Others……..…... 1 SC …….. 2 ST ……..…... 3 OBC …….. 4	
204	Type of house.(On observation)	Kachha …….. 1 Semi pucca ……..2 Pucca …… 3	
205	Ownership of house?	Own ……..…….. 1 Rented …….. 2 Govt.quaters/company quarters …… 3 Others(Specify……..……..)9	
206	How many rooms are there in your household (excluding Kitchen)	No. of rooms ……..……..	
207	Does this household have a separate room/place for cooking in the house?	Yes …….. 1 No …… 2	
208	Usually where does your family cook food?	Inside living room ……1 Separate room outside ……..….2 Open space ……3 Others (Specify……..……..)9	
209	What is the main source of drinking water for your household?	Tap ……1 Public tap ……..… 2 Hand pump …… 3 Well ……...4 River/Pond/Stream …….. .5 Tanker truck ……..…..6 Others (Specify……..……..)9	
210	What kind of toilet facility does your household have?	Own pit toilet/ latrin ……1 Shared pit toilet ……2 Public pit toilet …….. 3 No facility/bush/field ……..….4 Others(Specify……....)9	
211	What is the main source of lighting for your house?	Electricity …….. 1 Kerosene …… 2 Gas …… 3 Others (Specify……..…..)9	
212	What type of fuel does your household use?	Wood …….…… 1 Cow dung cakes …… 2 Coal/coke/lignite …….. 3 Charcoal ……..…... 4	

Q.No.	Questions and filters	Categories and coding	Skip To
		Kerosene ……..…… 5 Electricity ……..…. 6 Liquid petroleum gas ……..……7 Bio Gas ……..…. 8 Others (Specify……..……..)9	
213	What items does your household have?	Yes=1 No=2 Household electrification…….. 1 2 ***Ownership of a*** Mattress……...1 2 A pressure cooker……1 2 A chair……1 2 A cot/bed……1 2 A table……1 2 An electric fan……1 2 A radio /transistor……1 2 A black and white television……1 2 A color TV……...1 2 A sewing machine……1 2 A mobile telephone……...1 2 Any other phone……...1 2 A computer……...1 2 A refrigerator……1 2 A watch……1 2 A bicycle……1 2 A motorcycle or scooter……1 2 An animal drawn cart……1 2 A car……...1 2 A water pump……..1 2 A thresher……....1 2 A tractor……..1 2	
214	Does this household own any agricultural land?	Yes ……...1 No ……2	Q217 →
215	If yes, size of land	Irrigated land (in acre): ☐☐☐ Non-irrigated land (in acre): ☐☐☐	
216	How much land is used for cultivation?	☐☐☐	
217	Which livestock dose the household own?	Cow: Yes 1, No 2 Buffalo: Yes 1, No 2 Goat: Yes 1, No 2 Others(Specify……)9 1 2	

Q.No.	Questions and filters	Categories and coding	Skip To
218	Is this house classified under BPL(below poverty line) criteria?	Yes ……..…...1 No ……..…2	Q221 →
219	Do you have BPL cards?	Yes seen……..…1 Not seen……..……2	
220	If yes, are you availing the benefits under the scheme?	Yes ,Fully……1 Yes, Partially……...2 No……3	
221	Any member of household working under (MGNREGA)	Yes, Fully……1 Yes, Partially……2 No……3	

SECTION III: Socio Demographic Characteristics (Individual)

301	Record sex as observed	Female ……..…...1 Male……2	
302	How old are you?	☐☐	
303	Your weight in kilograms?	☐☐	
304	Your height in Centimeters?	☐☐☐	
305	Your current marital status?	Currently married……1 Separated……2 Widowed……3 Divorced……..4 Never married……..5 Cohabiting……...6	
306	What is the highest level of education that you have completed?	No formal schooling……1 Less than primary school ……2 Primary school completed……3 Secondary school completed……4 High school completed……5 College/ pre-university/ university completed……6 Post graduate degree completed……..7	
307	What is your current job?	Government employee……1 Non-government employee……..2 Self employed……..3 Employer……..4 Farming ……5 Agri- labour……6 Others Specify……..9 Not working for pay……7	Q309 →

308	What is the main reason you are not working for pay?	Homemaker/ caring for family……1 Looked but can't find a job……..2 doing unpaid work / voluntary activities…..3 Studies / training……4 Retired / too old to work……5 Ill health…….6 Others……9	
309	At what age did you started working for pay?	Years of age……	
310	At what age did you stop working for pay?	Years of age…… (Currently working …….99)	
311	How many years ago did you stopped working?	No of years…….. (Currently working…….99)	
312	Are you actively looking for work at this time?	Yes……...1 No……2	
313	What is the main reason that you would you like to work at present?	Need the income……1 Want to/ need to be active……2 Want to feel useful……3 Help my family……..4 Others, Specify……..5	

SECTION IV: Economic status and living arrangement of elderly

401	How do you meet your economic needs?	Self earnings……..…1 Bank balance ……...2 Pension ……3 Depending on others ……..…..4 (cont…)	Q404
402	State of economic dependence	Partially dependent on others……1 Fully dependent on others……2 Not depending on others ……..0	
403	If depending on others, who supports you economically?	Spouse ……..…1 Son ……..….2 Daughter ……..…3 Relatives ……..……4 Friends ……..……5 Others (sepecify……)9	
404	Do you receive any form of old age benefit from any source?	Yes ……..……1 No ……..……2	Q409
405	If yes, source of benefit		
406	Type of benefit?	Monetary……..…..1	

		Kinds……..……2 Others (specify.……)9	
407	How much benefit you are getting?	☐☐☐☐ (in rupees)	
408	Is that sufficient for you?	Yes ……1 No ……2	
409	If no what is your expectations?		
410	How long? (in years)	☐☐ Years ☐☐ Months	
411	What is the current amount in rupees?	☐☐☐☐	
412	Which scheme you know?		
413	Do you receive any help from that scheme?	Yes ……1 No ……...2	
414	If yes, what is that?		
415	What is the reason of living elsewhere?	…….. ……..	
416	Since how long she/he stays away from you?	……	
417	How often he/she visits you?	Regularly …… 1 Sometimes …… 2 Rarely …… 3 Never …… 4	
418	How often you visit him/ her?	Regularly …… 1 Sometimes …… 2 Rarely …… 3 Never …… 4	
419	Total number of children ever born (If none put'0')	Male …… ☐☐ Female …… ☐☐	
420	Total number of living children (If none put'0')	Son…… ☐☐ Daughter …… ☐☐	
421	No of children staying with you. (If none put'0')	Son…… ☐☐ Daughter …… ☐☐	
422	No of children away from you.	Son…… ☐☐ Daughter …… ☐☐	
423	If children away from you, how often they visit you?	Regularly …… 1 Sometimes …… 2 Rarely …… 3 Never …… 4	
424	Does your son spend some time with you?	Yes …….. 1 No …….. 2 N.A. …… 9	

425	If no, why?	…… …… ……..	
426	If yes, why did he spent time with you/when and how long?	…….. ……	
427	Does your daughter spend some time with you?	Yes …….. 1 No …….. 2 N.A. …… 9	
428	If no, why?	…… ……. ……..	
429	If yes, why did she spent time with you/when and how long?	……. …… ……	
430	With whom are you staying?	Living alone……. 1 Only spouse ……. 2 Spouse with unmarried son/s ….. 3 Spouse with married son/s ……. 4 Unmarried son/s …… 5 Married daughter/s…… 6 Others relatives …….. 7 Others (specify……..)9	
431	Who decided that you should stay with this person?	Yourself…….. 1 Spouse …….. 2 Sons….. …… 3 Daughters ……. …… 4 Relatives…… 5 Friends…… 6 Others (specify……..)9	
432	Did you agree with his/her decisions?	Yes …….. 1 No……. 2	
433	Do you have separate room for yourself?	Yes …….. 1 No……. 2	
434	If No, where do you sleep	Same room as children …….. 1 Veranda ……..2 Kitchen ……..3 Others ……4	
435	In the time since you completed 60 years of age have you faced any type of abuse or violence or neglect or disrespect by any person?	Yes..... ..... 1 Never ..... 2 →	Q501

436	What kind of abuse did you face and from where? a)Physical Abuse b)Verbal Abuse c)Economic Abuse d)Showing disrespect e)Neglect f)Other (SPECIFY)_____ _____		No	Yes within family	Yes outside family	Yes Both within family & Outside family	
		a	0	1	2	3	
		b	0	1	2	3	
		c	0	1	2	3	
		d	0	1	2	3	
		e	0	1	2	3	
		f	0	1	2	3	
437	Have you faced any type of physical or emotional abuse or violence in the last one month?	No ..... 1 →					Q501
		Physical 2					
		Emotional 3					
		Both, physical and emotional . 4					
438	From whom did you face the abuse during the last one month? (CIRCLE ALL RELEVANT RESPONSES)	Spouse .....01 Son .....02 Daughter.....03 Son-in-law.....04 Daughter-in-law .....05 Domestic helper.....06 Grand children .....07 Relatives.....08 Neighbors .....09 Other _____ 99 (SPECIFY)					
439	Did you suffer any health problems because of the abuse you faced in the last one month?	Yes .....1 No 2					

SECTION V:Satisfaction with living conditions

Now, let talk about your life and life situation.

		VERY SATISFIED	SATISFIED	NEITHER SATISFIED NOR DISSATISFIED	DISSATISFIED	VERY DISSATISFIED
Q501	How satisfied are you with the living conditions here in this dwelling?	1	2	3	4	5
Q502	How satisfied are you with your health?	1	2	3	4	5
Q503	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
Q504	How satisfied are you with your personal relationships?	1	2	3	4	5
Q505	How satisfied are you with the conditions in your living place?	1	2	3	4	5
Q506	Taking all things together, how satisfied are you with your life as a whole these days?	1	2	3	4	5
Q507	How would you rate your overall quality of life? *Read responses*	1. VERY GOOD 2. GOOD 3. MODERATE 4. BAD 5. VERY BAD 6. DON'T KNOW				
Q508	Taking all things together, how would you say you are these days? *Read responses*	1. VERY HAPPY 2. HAPPY 3. NEITHER HAPPY NOR UNHAPPY 4. UNHAPPY 5. VERY UNHAPPY 6. DON'T KNOW				

SECTION VI: Functionality

Q601.

I would like to ask some questions on the extent of help you require for daily activities					
Sl No.	Type of ADL (Q601)	Level of independence (Q602)	Who provides this assistance? (SEE CODE BELOW)	If the main caretaker is not present, who else provides help?	For how long have you required this assistance

			(Q603)	(Q604)	? (Q605)
1	BATHING	Do not require assistance ……..1 GO TO NEXT ROW Require partial assistance ..……..2 Require full assistance …… 3	Spouse …. 01 Son……..02 Daughter….. 03 Son/Daughter-in –law…….04 Relatives….. 05 Servant …...06 Other ……. 9 _____ (SPECIFY)	No one …. 00 Spouse …. 01 Son……..02 Daughter….. 03 Son/Daughter-in –law…….04 Relatives….. 05 Servant …...06 Other ……. 96 _____ (SPECIFY)	Less than 1 month ..1 1 to 6 months …….2 6 mths to year……...3. 1 to 5 years ……..4 5+ years ……... 5 Don't know …….8
2	DRESSING	Do not require assistance ……..1 GO TO NEXT ROW Require partial assistance ..……..2 Require full assistance …… 3	Spouse …. 01 Son……..02 Daughter….. 03 Son/Daughter-in –law…….04 Relatives….. 05 Servant …...06 Other ……. 9 _____ (SPECIFY)	No one …. 00 Spouse …. 01 Son……..02 Daughter….. 03 Son/Daughter-in –law…….04 Relatives….. 05 Servant …...06 Other ……. 9 _____ (SPECIFY)	Less than 1 month ..1 1 to 6 months …….2 6 mths to 1 year……..3 1 to 5 years ..……4 5+ years ……..…. 5 Don't know …….8
3	TOILET	Do not require assistance ……..1 GO TO NEXT ROW Require partial assistance ..……..2 Require full assistance	Spouse …. 01 Son……..02 Daughter….. 03 Son/Daughter-in –	No one …. 00 Spouse …. 01 Son……..02 Daughter….. 03	Less than 1 month ..1 1 to 6 months …….2 6 mths to 1 year……..3 1 to 5

		……. 3	law…….04 Relatives….. 05 Servant …...06 Other ……. 9 _____ (SPECIFY)	Son/Daughter -in – law…….04 Relatives….. 05 Servant …...06 Other ……. 9 _____ (SPECIFY)	years ..……4 5+ years ……..…. 5 Don't know …….8
4	MOBILITY	Can move in and out of bed/ chair without assistance (may be using cane or walker for support)……1 GO TO NEXT ROW Can move in and out of bed/ chair with assistance …….…… …2 Can not get out of bed …….. 3	Spouse …. 01 Son……..0 2 Daughter….. 03 Son/Daughter -in – law…….04 Relatives….. 05 Servant …...06 Other ……. 9 _____ (SPECIFY)	No one …. 00 Spouse …. 01 Son……..0 2 Daughter….. 03 Son/Daughter -in – law…….04 Relatives….. 05 Servant …...06 Other ……. 9 _____ (SPECIFY)	Less than 1 month ..1 1 to 6 months …….2 6 mths to year…...3 1 to 5 years ..……4 5+ years ……..…. 5 Don't know …….8
5	CONTINENCE	Can controls urination and bowel movements completely by self ...…1 GO TO NEXT ROW Has occasional " accidents" …….…… 2 Supervision helps keep urine or bowel control; catheter is used or is incontinent ……..…… 3	Spouse …. 01 Son……..0 2 Daughter….0 3 Son/Daughter -in – law……04 Relatives….0 5 Servant …...06 Other ……. 9 _____ (SPECIFY)	No one …. 00 Spouse …. 01 Son……..0 2 Daughter….0 3 Son/Daughter -in – law……04 Relatives….0 5 Servant …...06 Other ……. 9 _____ (SPECIFY)	Less than 1 month ..1 1 to 6 months …….2 6 mths to year…...3 1 to 5 years ..……4 5+ years ……..…. 5 Don't know …….8
6	FEEDING	Do not require assistance	Spouse …. 01	No one …. 00	Less than 1 month ..1

		……..1 GO TO NEXT ROW ↓ Require partial assistance ...……..2 Require full assistance …… 3	Son……..02 Daughter….03 Son/Daughter -in – law……04 Relatives….05 Servant …...06 Other ……. 9 _____ (SPECIFY)	Spouse …. 01 Son……..02 Daughter….03 Son/Daughter -in – law……04 Relatives….05 Servant …...06 Other ……. 9 _____ (SPECIFY)	1 to 6 months …….2 6 mths to year…...3 1 to 5 years ..……4 5+ years ……..…..5 Don't know …….8
Now I am going to ask you some questions regarding instrumental activities of daily living (IADLs) which are activities that are not necessary for fundamental functioning, but they let an individual live independently in a community					
Q606	ABILITY TO USE TELEPHONE	Operates phone on own initiative ……..…… 1 Dials a few well known numbers ……..…… 1 Answers the phone but does not dial ……..…… 1 Cannot use phone at all ……...… 0			
Q607	SHOPPING	Takes care of all shopping needs independently …...…… 1 Shops independently for small purchases ……..…… 0 Needs to be accompanied on any shopping trip ……..…… 0 Completely unable to shop … …...… 0			
Q608	FOOD PREPARATION	Plans, prepares and serves adequate meals independently……..…… 1 Prepares adequate meals if supplied with ingredients ……..…… 0 Heats, serves meals ; does not maintain adequate diet ……..…… 0 Needs to have meals prepared and served ……..…… 0			
Q609	HOUSEKEEPING	Maintains house alone or with help for heavy work ……..…… 1 Performs light daily tasks e.g. dish washing, bed making ……..…… 1 Performs light daily tasks but cannot maintain			

		cleanliness ……..…… 1 Needs help with all home maintenance tasks ……..…… 1 Does not participate in any housekeeping tasks ……..…… 0	
Q610	LAUNDRY	Does personal laundry completely ……..…… 1 Launders small items, rinses socks etc. ……..…… 1 All laundry must be done by others ……..…… 0	
Q611	TRANSPORTATION	Travels independently on public transport/own car ……..…… 1 Travels on public transport when accompanied by others ……..…… 1 Travel limited to car with assistance of another ……..…… 0 Does not travel at all ……..…… 0	
Q612	MEDICATION	Is responsible for taking medicine in correct dosage at correct time ……. 1 Takes medicine if given in separate dosage ……..…… 0 Is not capable of dispensing own medicines .....…… 0	
Q613	FINANCES	Manages financial matters independently (budget, cheques, bill) ..……. 1 Manages day to day purchases, but need help with banking etc ...……. 1 Incapable of handling money ...……. 0	
Q614	TOTAL (NOT TO BE FILLED BY THE INVESTIGATOR)	TOTAL SCORE OF IADL: ☐	

SECTION VII: Risk Factors and Preventive Health Behaviors

Personal Habits and Risk Behaviours

Sl No	Have you ever had '--------' habit? Yes = 1 No = 2 (Q701)		**What age you started? (Q702)**	Have you '---- ' in the last one month? Yes = 1 No = 2 (Q703)	**When did u stopped?** (Q704) IN AGE	How frequently do you indulge in this habit? (Q705)	How much do you spend on "_____"? (Q706)	Who pays for it? Self……. 1 Spouse…… 2 Children……. 3 Relatives ……4 Other _____6 **(SPECIFY)** **(Q707)**
A	Smoking cigarettes or bidis	1 2→ GO TO NEXT LINE	☐☐	1 → **Q705** 2 → **Q704**	☐☐ GO TO NEXT LINE	☐☐/ per day	☐☐☐ / per **MONTH**	___☐
B	Alcohol consumption	1 2→ GO TO NEXT LINE	☐☐	1 → **Q705** 2 → **Q704**	☐☐ GO TO NEXT LINE	Daily……1 Once or twice a week……2 Once or twice a month……3 Occasionally…..4	☐☐☐ / **Per month**	_____☐
C	Chewing Tobacco or other intoxicant (snuff, pan, pan masala, ghutka)	1 2→ GO TO NEXT LINE	☐☐	1 → **Q705** 2 → **Q704**	☐☐ GO TO NEXT LINE	☐☐ / per day	☐☐☐/ per **month**	_____☐

SECTION VIII: Chronic Conditions and Health Services Coverage

Now I would like to read you questions about some health problems or health care needs that you may have experienced, and the treatment or medical care that you may have received.

SNO	Has a doctor or nurse ever told you that you have any of the following ailments? Yes = 1 No = 2 (Q801)		How long have you been suffering from this ailment? Less than 1 month .1 1 to 6 months ……2 6 months to year…..3 1 to 5 years …….4 5+ years ……..5 Don't know ……...8 (Q802)	Have you been taking medications or treatment for last three months? (Q803)	What is the main source for this treatment? (SEE CODE BELOW) (Q804)	How much on average do you pay for this treatment/ Medicine per month? In Rs. (Q805)	Who pays for your treatment? Self = 01 Spouse = 02 Son = 03 Daughter = 04 Son/Daughter-in-law = 05 Relatives = 06 Friends = 07 Insurance = 08 Employer = 09 Other =96 (Q806)	What is the main reason you are not receiving any treatment? (SEE CODE BELOW) (Q807)
A	Arthritis, rheumatism or Osteoarthritis	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
B	Cerebral embolism, stroke or Thrombosis	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
C	Angina or angina pectoris (heart disease) (Heart attack,	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐

	coronary heart disease, angina, congestive heart failure or any other heart problem)							
D	Diabetes	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
E	Chronic lung disease (emphysema, bronchitis, COPD)	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
F	Asthma (allergic respiratory disease)	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
G	Depression	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
H	High blood pressure (hypertension	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
I	Alzheimer's disease	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
J	Cancer	1 2→	☐	Yes = 1 No = 2	☐☐	☐☐☐☐☐	☐☐	☐☐

		GO TO NEXT LINE		GO TO Q807		If =0, GO TO NEXT LINE		
K	Dementia	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
L	Liver or gall bladder illness	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
M	Osteoporosis	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
N	Renal or Urinary tract infections	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
O	Cataract	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
P	Loss of all natural teeth	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
Q	Accidental injury (in past one year)	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
R	Injury due to fall (in the	1 2→	☐	Yes = 1 No = 2	☐☐	☐☐☐☐☐	☐☐	☐☐

	past one year)	GO TO NEXT LINE		GO TO Q807		If =0, GO TO NEXT LINE		
S	Skin disease	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐
T	Paralysis	1 2→ GO TO NEXT LINE	☐	Yes = 1 No = 2 GO TO Q807	☐☐	☐☐☐☐☐ If =0, GO TO NEXT LINE	☐☐	☐☐

Code for Q.801	Code for Q.807
Government hospital/ Clinic 01 Private hospital/ clinic 02 Charitable / Missionary 03 NGO hospital/ clinic 04 AYUSH hospital/ clinic 05 Pharmacist/ Dispensary 06 Ritualistic healing 07 Un-qualified medical practitioner…....08 Self medication .09 Other ……..…...96 Don't Know……...…98	Ailment cured……..……0 No medical facility available in the neighborhood……1 Facilities available but lack of faith …….. 2 Long waiting time……3 Financial reasons……..…4 Ailment not considered serious ……..…5 Others ……. ……...6

Sl No	Do you have any difficulty with any of the following? (Q808)	Do you use any of the following aids? (Q809)	Who mostly provided the finances for the aids? Self…….. 1 Children…… …2 Voluntary agents…3 Other _____ 6 (SPECIFY) (Q810)	How well can you function (see/hear/ walk/ chew) with '___'? Very well…….. 1 Somewhat well……. 2 Very Unsatisfactory. 3 (Q811)

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A	Vision	Yes, fully…….1 Yes, partially...2 No…….3 GO TO NEXT ROW	a. Spectacles or lenses	Yes..1 No…2 GO TO NEXT ROW	☐	☐
B	Hearing	Yes, fully…….1 Yes, partially...2 No…….3 GO TO NEXT ROW	b. Hearing aids	Yes..1 No…2 GO TO NEXT ROW	☐	☐
C	Walking	Yes, fully…….1 Yes, partially...2 No…….3 GO TO NEXT ROW	c. Walking stick or other	Yes..1 No…2 GO TO NEXT ROW	☐	☐
D	Teeth (chewing)	Yes, fully…….1 Yes, partially...2 No…….3 GO TO NEXT ROW	d. Dentures	Yes..1 No…2 GO TO NEXT ROW	☐	☐
E	Speaking	Yes, fully…….1 Yes, partially...2 No…….3 GO TO NEXT ROW				
F	Memory	Yes, fully…….1 Yes, partially...2 No…….3 GO TO NEXT ROW				

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SECTION IX: Health care utilization

I would now like to ask you some questions about recent ailments (pre –hospitalization).					
Q901	Were you sick for any time during the last one month ?	Yes……...1 No ……2			1001 →
Q902	How many times have you been sick in the last one month ? INTERVIEWER: CIRCLE SERIAL NUMBER OF EPISODE	Episode 1 (Q904a)	Episode 2 (Q904b)	Episode 3 (Q904c)	
Q903	What was your ailment each time? WRITE DOWN THE NATURE OF THE AILMENT REPORTED				
Q904	What is the status of your ailment ? Started more than one month ago and is continuing =1 Started more than one month ago and has ended = 2 Started within one month and is continuing = 3 Started within one month and has ended = 4	☐	☐	☐	
Q905	What was/is the total duration of ailment ? (IN DAYS)	☐☐☐	☐☐☐	☐☐☐	
Q906	Did you take any treatment for your illness	Yes.....….1 No ……..…2	Yes.....……..….1 No ..……2	Yes .....…1 No……...2 →	Q912
Q907	How many times did you visit a health care provider for treatment?	☐☐	☐☐	☐☐	

Q908	Where did you go for treatment (pre-hospitalisation)? Government hospital/ clinic 01 Staff at SC/ PHC 02 Private hospital/ clinic 03 Charitable / missionary……..……..04 NGO hospital/ clinic 05 AYUSH hospital/ clinic 06 Pharmacist/ Dispensary 07 Ritualistic healing 08 Unqualified medical practitioner….. 09 Self medication 10 Other _____ __96 (SPECIFY)	☐☐	☐☐	☐☐	
Q909	Who accompanied you during each episode? None ……00 Spouse ……...01 Son……... .02 Daughter…… …03 Son/Daughter-in-law……04 Grandchildren…… …05 Relatives…… …06 Friends ……..07 Other _____96	☐☐	☐☐	☐☐	
Q909a	Have you been hospitalised due to this illness? Yes – 1→ (GO TO NEXT EPISODE; ELSE MOVE TO	☐	☐	☐	

	Q 1001) No – 2				
Q910	How much did you spend for treatment? Consultation Medicines Lab, xray, and other diagnostics Transportation Other _____ f. Total	a. _____ Rs b._____ _Rs c._____ _Rs d._____ _Rs e._____ _Rs f…… Rs	a. _____ Rs b._____ _Rs c._____ _Rs d._____ _Rs e._____ _Rs f._____ _Rs	a._____ _Rs b._____ _Rs c._____ _Rs d._____ _Rs e._____ _Rs f._____ _Rs	
Q911	Who paid for your treatment? Self …… …. 01 Spouse ……... 02 Son…… ……... 03 Daughter…… ……. 04 Son-in-law/ Daughter-in-law ……. 05 Relatives ……06 Friends ……07 Insurance ……08 Employer ……09 Other _____ _96	☐☐	☐☐	☐☐ →	Q1001
Q912	What is the reason for not taking any treatment? No medical facility available in the neighbourhood……	☐	☐	☐	

	…….. 1 Facilities available but lack of faith…… 2 Long waiting …….. .3 Financial reasons ……4 Ailment not considered serious …….. 5 Other _____ _____ 6				

HOSPITALISATION:

Q1001	Did you have any major health problem during the last 365 days requiring hospitalization?	Yes .....1 No .....2 →				
Q1002	How many times have you been hospitalized for an ailment? INTERVIEWER: SERIAL NUMBER OF EPISODE OF HOSPITALISATION	1 (Q545a)	2 (Q545b)	3 (Q545c)	4 (Q545d)	5 (Q545e)
Q1003	What was your ailment each time? INTERVIEWER: WRITE DOWN THE NATURE OF THE AILMENT REPORTED					
Q1004	What was the type of hospital? Government Hospital……1 Private hospital ……2 Charitable/ missionary……..3 NGO-run hospital……..4 AYUSH hospital/ clinic……5 Other _____6 (SPECIFY)	☐	☐	☐	☐	☐
Q1005	What was the type of ward? Free……1 Paying general……2 Paying special……..3	☐	☐	☐	☐	☐

Q1006	Who took you to the hospital? No one……00 Spouse……...01 Son……...02 Daughter……...03 Son/Daughter-in –law……...04 Relatives……...05 Servants……...06 Other_____96 (SPECIFY)	☐☐	☐☐	☐☐	☐☐	☐☐
Q1007	What was the duration of stay in hospital? (IN DAYS)	☐☐☐	☐☐☐	☐☐☐	☐☐☐	☐☐☐
Q1008	Who stayed with you in the hospital to take care of you? No one……00 Spouse……...01 Son……...02 Daughter……...03 Son/Daughter-in –law……...04 Relatives……...05 Servants……...06 Other_____96 (SPECIFY)	☐☐	☐☐	☐☐	☐☐	☐☐
Q1009	How much did you spend for treatment? Consultation Medicines Lab, xray, and other diagnostics Hospitalisation Transportation Food Other_____ Total Expenditure Other indirect Cost	a._____ Rs b._____ Rs c._____ Rs d._____ Rs e._____ Rs f._____ Rs g._____. Rs h……. Rs i…….Rs	a. _____Rs b.____._____ Rs c._____ _Rs d._____ Rs e._____ Rs f._____Rs g._____ Rs h……..Rs i……Rs	a._____ Rs b._____ Rs c._____ Rs d._____ Rs e._____ Rs f._____ Rs g._____. Rs h……. Rs i…….Rs	a._____ Rs b._____ Rs c._____ Rs d._____ Rs e._____ Rs f._____ Rs g._____. Rs h……. Rs i…….Rs	a. _____Rs b.____._____ Rs c._____ _Rs d._____ Rs e._____ Rs f._____Rs g._____ Rs h……..Rs i……Rs
Q1010	Who paid for your treatment? Self ……. 01 Spouse……. 02 Son……. 03 Daughter……. 04 Son-in-law/ Daughter-in-law……. 05 Relatives……. .06 Friends……. 07	☐☐	☐☐	☐☐	☐☐	☐☐

	Insurance Company……...08 Employer……09 Other_____96					

Mental health

Questions	Coding Categories	
Q1102 Have you recently:	Yes=1	No=2
Been able to concentrate on whatever you are doing?	1	2
Lost much sleep over worry?	1	2
Felt that you are playing a useful role?	1	2
Felt capable of making decisions about things?	1	2
Felt constantly under strain?	1	2
Felt you could overcome your difficulties?	1	2
Been able to enjoy your normal day- to –day activities?	1	2
Been able to face up to your problem?	1	2
Been feeling unhappy and depressed?	1	2
Been loosing confidence in yourself?	1	2
Been thinking of your self as a worthless person?	1	2
Been feeling reasonably happy, all things considered?	1	2

SECTION XII:

Social adjustment:

Q1201	Do you cross the street to avoid somebody you don't want to meet?	1	2
Q1202	Do you make friends easily?	1	2
Q1203	Do you hesitate to meet on your own important and highly placed person?	1	2

Q1204	Do you have more people disliking you than liking you?	1	2
Q1205	Do you have unpleasant arguments and disagreements with friends or outsiders fairly often?	1	2
Q1206	Do you tire of people quickly?	1	2
Q1207	Do you generally prefer to be alone rather than in the company of people?	1	2
Q1208	Do you feel tried much of the time?	1	2
Q1209	Do you often hesitate to speak out before a group let you may speak and do the wrong thing?	1	2
Q1210	Do you often organize or play a leading role in social gatherings and functions?	1	2
Q1211	Do you often have difficulty keeping up a conversation with a person to whom you had just been introduced?	1	2
Q1212	Do you find it easy to ask others for help?	1	2
Q1213	Do you feel others carry grudges against you?	1	2
Q1214	Do you find that you have few close friends rather than many casual acquaintances?	1	2
Q1215	Would you feel self conscious to ask an employer for work?	1	2